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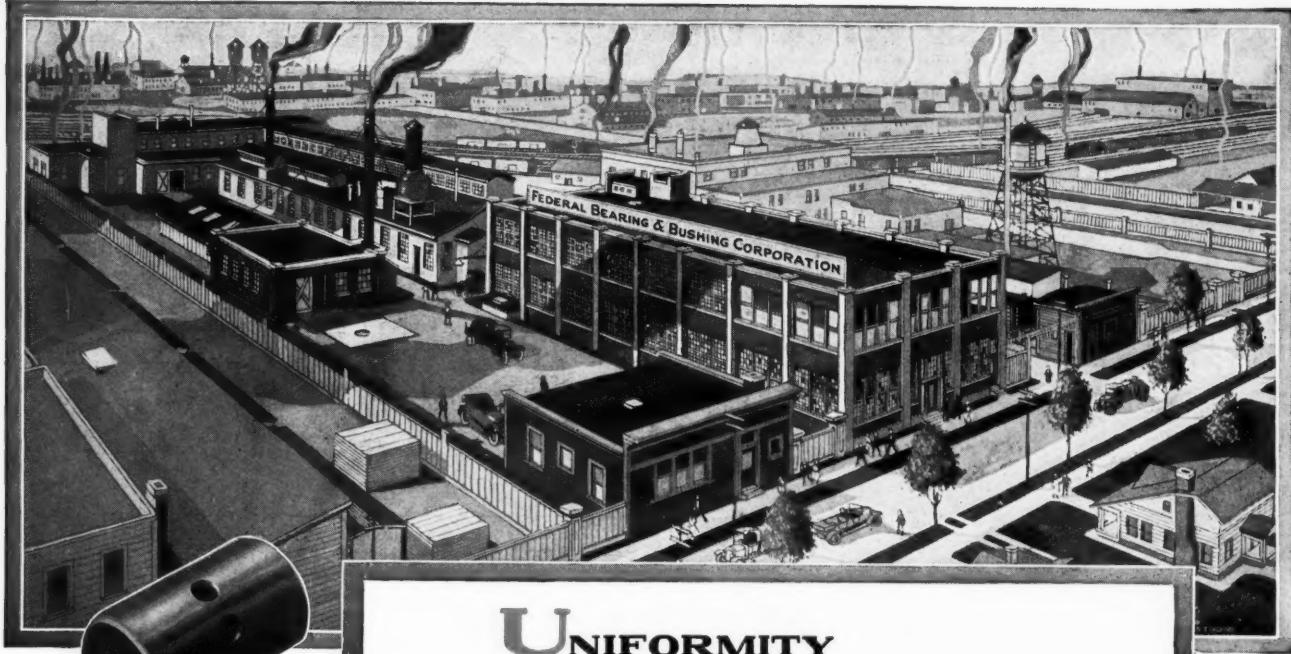
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No. 26

Development of Public Motor Transport in Germany

Use of trucks to supplement the railroads in handling passengers, freight and mails has been found necessary. These vehicles are operated in large fleets by highly trained staffs, the service being controlled by motor transportation companies owned by local governments. National Government provides the vehicles in return for stock in these companies. Post Office Department operating passenger vehicles.

By Benno R. Dierfeld*

PRIOR to the war the use of motor vehicles in public transport had not reached the same state in Germany as in some other countries, notably England. The principal reasons for this backwardness were that the capabilities and the economy of the commercial motor vehicle had not been sufficiently demonstrated, that but little practical experience had accumulated and that the Government authorities and the general public alike looked upon the new means of transport with disfavor. Even the subsidy plan of the Prussian Ministry of War, which was designed to promote the use of motor trucks by private concerns in their own business, was only moderately successful. The few private enterprises maintaining a commercial vehicle service for public use met the demand for transportation in only a very inadequate manner. These services suffered from

poor technical management, poorly equipped repair-shops and excessive operating costs.

Saxony, Bavaria and Baden maintained state motor bus services in districts without railroads, with comparatively favorable results, but in the remainder of Germany there were no such motor bus lines. When war broke out, the motor services in the three states mentioned were discontinued, the omnibuses being requisitioned for military purposes, and, besides, the shortage of fuel would have made it impossible to operate them privately in any case. It was soon shown, however, that commercial motor vehicles were indispensable, and before the war came to an end, a motor traffic organization was created whose operations extend over the whole country.

Toward the end of 1916 there arose a transport crisis in some of the large cities of the empire, due to the enormous amount of traffic on the railways, and to the lack of horses. The military authorities, which

*Recognized automotive writer in Germany and frequent correspondent of AUTOMOTIVE INDUSTRIES.

at that time controlled all of the motor trucks in the country, were obliged to order a number of trucks for the express purpose of relieving the congestion at railroad stations, which were overcrowded with freight. Later on other trucks were needed for carrying agricultural produce to market and for supplying the war industries.

In 1917-18 the Government departments of railways, posts, war and food supplies induced the General Staff of the army to release a great number of motor truck columns for use in the home service. After demobilization, this military motor truck transport organization, which had been engaged only in non-military work, was converted into a civil organization and placed under the Treasury Department, to engage principally in freight haulage, with the object of relieving the railways. A second large motor traffic organization, in charge of the Postmaster-General, serves for passenger and mail transport, in the same manner. Of course, these services could not be kept running without an extensive system of repairshops throughout the entire country. Such repairshops exist at automotive factories and at automobile sales establishments, but the services can also invoke the help of machine shops doing repair work on agricultural machinery, bicycles, sewing machines, etc.

The advantages of such large motor transport organizations, with centralized control, are numerous. The operation of single or a few motor trucks by private owners generally does not prove a paying proposition, because there are too many difficulties to contend with. The private owner does not possess the necessary mechanical knowledge to select the right kind of truck; he cannot judge the qualifications of the drivers, and cannot give sufficient attention to the proper maintenance of the trucks, checking of operating costs, etc. Repairs are often entrusted to incompetents and prove very expensive. The need for them frequently arises at times when the trucks are urgently needed, and, furthermore, the truck often stands idle for a long period of time, owing to lack of work for it.

Such difficulties are avoided by large organizations. Some of the trucks, and particularly trucks designed for special purposes, are being hired out to small and large customers for shorter or longer periods. Other advantages are the uniformity of management, centralization of technical supervision and of material purchasing and storing, the maintenance of a fleet of reserve trucks to meet any extra demands and the execution of repairs in large, well-equipped repairshops.

In the following is given an outline of the two great German state enterprises for freight and passenger transport by motor vehicle.

A. Motor Freight Service

In 1917-18, 115 military motor truck columns were placed in the home service, under the control of the Treasury Department. Despite great difficulties, bad condition of the steel-tired vehicles; inability to secure good drivers, these being greatly needed at the front; lack of adequate repairshops for this particular work; great loss of time caused by repairs in outside shops and poor work done by same; poor grade of fuel available,

etc.), these columns have performed their work in a remarkable manner. They have been used principally for transporting agricultural produce such as potatoes, turnips, vegetables, grain, etc.; also to carry coal, wood, iron, fertilizer, piece goods, road material, etc., from the producer to the railroad freight station, or from the railroad freight station to the consumer; while again they have been used in large overland transports from warehouse to warehouse.

The performance of these truck columns is well illustrated by some particulars of the work done in October, 1918, the month before the revolution, and consequently the last month during which normal conditions reigned. During this month 302,000 tons of freight were carried an aggregate distance of 845,000 kilometers, the useful work done amounting to 3,157,000 ton-kilometers. The total distance traveled, both loaded and empty, amounted to 1,483,000 km., and the total consumption of fuel was 1,170,000 liters. This performance was not equalled after the revolution, owing to the continual outbreak of strikes, diminished fuel production, general aversion to work, and occupation of a considerable portion of the country by the Allies.

In March, 1919, there were 14 motor traffic offices in the larger towns, which controlled 107 motor truck columns, comprising 2,000 trucks and 17 emergency or repair road trains. The truck columns were distributed over 70 counties, with branches in villages or on larger estates. The number of office employees and workmen was about 3,000.

Up to the present the service has been a Government affair entirely, but it is to be gradually transformed into a number of

enterprises, of local character, in order to better accommodate the service to local conditions. The new enterprises are named "Kraftverkehrsgesellschaften" (motor traffic companies) and are incorporated. The capital of the company usually is raised in part by villages, townships, counties, etc., within the operating range of the company. The National Government assigns the stock of motor vehicles to the company, and in turn receives a portion of its share capital. The capital stock of these companies varies from 250,000 marks to 1,500,000 marks. At present there are 16 motor traffic companies operating 98 service departments. The operating territories, location of main offices and number of service departments are as follows:

Territory of company	Headquarters of company	Number of service departments
1. Ostpreussen	Koenigsberg	4
2. Pommern	Stettin	6
3. Nordmark	Hamburg	7
4. Schlesien	Breslau	7
5. Marken	Berlin	8
6. Lakwa Essen	Essen	10
7. Sachsen-Anhalt	Merseburg	5
8. Niedersachsen	Bremen	9
9. Hessen	Frankfort-on-the-Main	4
10. Rheinland	Cologne	8
11. Sachsen	Dresden	5
12. Thüringen	Weimar	1
13. Braunschweig	Brunswick	2
14. Wuerttemberg	Stuttgart	4
15. Baden	Karlsruhe	2
16. Bayern	Munich	16



Fig. 2—Types of passenger and mail carrying buses operated by German Post Office Department

At present the total number of office employees and workmen is about 3,000; the rolling stock comprises 2,871 motor trucks, 37 tractors, 1,079 trailers, 187 passenger cars, 126 motorcycles and more than 150 motor buses.

As above mentioned, all of the companies were established solely with public funds, the National Government participating to the extent of about 70,000,000 marks, of which about 7,750,000 marks is invested in the stocks of the companies and 63,000,000 marks is in the form of loans. Local governments have invested about 18,000,000 marks in these enterprises. The capital resources of the companies are to be augmented in the future by interesting further communities and by the National Government assigning further motor vehicles. Of course, these figures of capitalization are not a measure of the total property value, as at present motor vehicles sell at higher prices than at any time since the organization of the services, and, furthermore, equipment purchased in the course of service is not included in these valuations.

In order to improve the working economy of these enterprises, first of all the worn-out trucks were exchanged for new or overhauled ones, and then additional new trucks and trailers were obtained from the Government. As far as possible, the trucks were provided with rubber tires, stocks of spare parts were replenished, and the shops were newly equipped. Finally, competent men were placed in charge of the technical and business departments of these companies. In order to ensure that the income would keep pace with the increasing expenses of the companies, a considerable advance of the transport charges was necessary; the charges originally made, which were fixed by the military authorities, were very low (0.60 mark for the ton-kilometer) and the National Government was compelled to subsidize the enterprise.

A further increase in the charges was necessitated by the soaring of prices of all supplies needed and the considerable increase of salaries and wages. Native benzol rose to six times its peace-time price and foreign benzol to ten times that price. Rubber also had to be purchased at unprecedented prices owing to the depreciation of the mark. Strikes, temporary lack of fuel and the tying up of a large number of trucks in repair shops caused stoppages in the service; finally, the general economical and political situation had a very detrimental effect on the financial success of the enterprise.

Nevertheless, in one month about 70,000 tons of coal

and about 18,000 tons of victuals were transported, and in three months the total volume of freight carried was about 400,000 tons. The motor truck during this period did the work of more than 800 freight trains—not a mean performance in a period of chronic transportation difficulties. Among the materials carried were wood, coal, peat, stone, potatoes, building materials, machines, iron, cinders, gravel, clothes, household goods. Transport work was derived from the following sources: Agriculture, 17 per cent; industry, 49 per cent; municipalities, 26 per cent; army depots, 2 per cent; miscellaneous, 6 per cent.

The motor traffic companies also hire out their motor trucks or road trains with drivers, etc., to all interested parties for any desired length of time; the rentals are as follows: For the service of a motor truck in covering a maximum total distance of 50 kilometers in 8 hours, inclusive of the trips to the loading point and back to the garage, a charge of 325 marks is made; any longer service on the same day costs 40 marks per hour or fraction thereof. If a greater distance than 50 km. is to be covered (always including drive from and to garage), an extra charge of 6.50 marks per kilometer is made. A trailer costs 100 marks a day; a helper, 6 marks per hour; furthermore, in the case of trips extending over more than one day, maintenance charges of 24 marks per man and day are made. Fig. 1 shows a standard motor truck for freight transport, built by the Opel Works. This truck has a load capacity of five tons and can be used with one or two trailers.

The uses to which the motor truck lends itself are amazingly varied. In the first place, it serves for carrying goods from remote points to the railway terminals. This is a very important service, because in this way regions with little or no rail service are rendered accessible. As a consequence, the traffic on the railways is increased and a faster mail service is also insured. As is well known to all shipping men, the railroads cannot successfully compete with the motor truck in short distance freight haulage, say over distances of 12 to 25 miles; the high cost of transport to and from the terminals and of switching individual freight cars, especially in view of the very high wages now paid in Germany, makes this impossible. Furthermore, a large number of freight cars are thereby withdrawn from service in long distance freight haulage, their natural field, with the consequence of an increase in freight charges. Un-



Fig. 3—Vomag motor omnibus with trailer used by German Post Office Department where traffic is heavy

der these conditions the motor truck is the fastest and most economical means of short haul freight transport.

Agricultural production has been considerably increased by this means of transport; and the buying power of the farming population has consequently been increased, which means that there is a market among them for more machines and other industrial products. In many cases the motor truck obviates the need for building railways. This is very important, as, on account of the immense costs, the state cannot afford to build any new railways at present. Numerous freight cars are released for other more pressing needs by the use of motor trucks in hauling coal from the mines to nearby industrial and electrical works.

In spite of all the unfavorable influences, the periodical reports of the motor traffic companies show that with one or two exceptions they are earning money and paying dividends. This warrants the expectation that with the dawn of better times, the prosperity of these companies is assured. As time goes on it will no doubt be possible to reduce the charges for service and it is, moreover, expected to effect a considerable economy in operation by using 5-ton trucks with trailers instead of the 3-ton trucks mostly used to-day.

B. Passenger and Mail Services.

The motor traffic companies mentioned above have also taken up passenger transport, and at present over 150 motor buses run on about 50 lines of an aggregate length of about 1600 km. But a combination of freight and passenger service does not seem to work out very well, because of the different working conditions. Therefore, in the future passenger services will probably be conducted exclusively by the Post Office Department, which will also carry the mails, parcels, etc. Certainly the post office is better equipped to handle this service than the motor traffic companies; carrying mails (letters, parcels, etc.) alone is too expensive, consequently it is advantageous to carry passengers on the mail lines, just the same as in the old mail coaches of 75 years ago.

The first motor mail line was established in 1906, but it did not show the anticipated success and shortly before the war there were only 47 governmental motor buses in service on mail lines. However, the number of private motor bus lines carrying the mails was considerably greater. In 1914 there were 101 government-owned four-wheel motor cars in service transferring and collecting mails in the cities, most of them of the electric type.

There were also 124 small three-wheeled electric cars in this service.

The German Post Office Department has under consideration the following plans:

1. To establish motor car mail and passenger lines in the country.
2. To develop and extend the city motor car services.
3. To establish motor car columns for telegraph and telephone construction and maintenance.

The government traffic companies, above mentioned, have been ordered not to establish passenger lines, except upon an agreement with the Post Office Department. Experience with mail and passenger lines in the post office services has been that they can be made profitable only if fleets of at least five vehicles are used and the total distance covered amounts to at least 200 kilometers per day. To increase the receipts in districts with a heavy tourists' traffic, special summer lines may be provided. Garages at the terminals, properly heated and lighted, are generally to be furnished by the communities interested. The network of country motor mail services is to comprise about 100 lines with a total of 3000 kilometers and employing 260 motor buses to begin with. Fig. 2 shows some of these mail buses, built by the Magirus Co. of Ulm. They have 12 to 20 seats. The fare is 0.50 mark per passenger per kilometer, 0.05 mark being charged for each piece of baggage (up to 30 kilograms) per kilometer. The seats are comfortably upholstered; lighting, both interior and exterior, is by a generator and battery system, and heating by the exhaust gases. On some lines with heavy passenger traffic motor buses with trailers are used. An example of these combinations is shown in Fig. 3, these vehicles being built by the Vomag at Plauen.

Passenger car services in the large cities are capable of much greater development, and a first instalment of 400 to 500 vehicles is provided for; they are mostly chassis of 1 to 2 tons capacity. These services are to comprise not less than five motor buses each and will carry passengers and the mails from and to railway stations.

For the transport of materials for telegraph and telephone construction, use will be made of 160 to 200 trucks of 3 to 4 tons capacity. All these truck types are standardized, so that the production is cheapened and repairs and replacement of parts are facilitated. Repairs, overhauling, etc., are effected at the system's own centrally located shops, with branches in the smaller towns.

The Winter Top Improves Appearance and Utility of Car

Has advantage of lighter weight and lower cost as compared to closed car and is readily applicable to ordinary runabout or touring body. Both glass and celluloid lights are used with some parts usually permanent and others removable. The popularity of this top is increasing.

By George J. Mercer

WINTER tops on standard open bodies are becoming more common on cars produced in quantity. The idea is not new, but the results are more satisfactory now than formerly. The Franklin features a top of this description on their runabout, as shown in the accompanying illustration.

It is claimed that with this top the car combines the flexibility of the runabout with the comfort of the enclosed body, without the weight of the latter. It is especially applicable for business or professional use.

The material used for covering is Fabrikoid. The top is a permanent structure and is not intended to be lowered. The triangular glass sections at the forward end are part of the windshield and can be used as wings when the window panels are removed in warm weather. The interior of the top is lined with duck, a material that makes for warmth when the top is enclosed and at the same time will not hold the dust when top is used without the side windows. The latter may be removed for summer use and regular storm curtains carried in the pocket at the rear of the seat for emergency use. The height of seat from floor is 13 in. and the head room from top of cushion to under roof is 39 in. The luggage pocket at rear of seat is 7½ in. wide by 38 in. long by 14 in. deep.

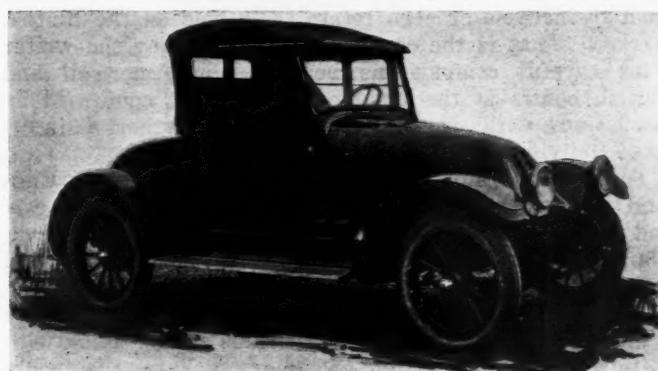
The Cole Co. is featuring two models with permanent tops, the "All Season Sportster," seating five passengers, and the "All Season Tourster," seating seven passengers, one illustration of which is shown herewith.

This is a good example of the up-to-date method of enclosing the open car without losing the advantages of the clear open side when required. At the same time the addition of this form of top gives ample protection and comfort during cold and inclement weather, while the saving of weight over a closed body is considerable.

As this top is not collapsible, the supports can be made strong, yet the large plate glass windows at the side and rear afford ample vision. The side glass is 28 in. long and the rear is 24 in. by 12 in. The width of the doors, front and rear, are 27½ in. over the moldings and there are inside and outside handles. All side curtains are made with celluloid lights and can be instantly attached. When not in use they are carried in the roof and are invisible.

The interior of the top is equipped with dome and reading lamps, and flexible robe rail and footrests are used.

The windshield is three-piece and has a slant of 18 deg.

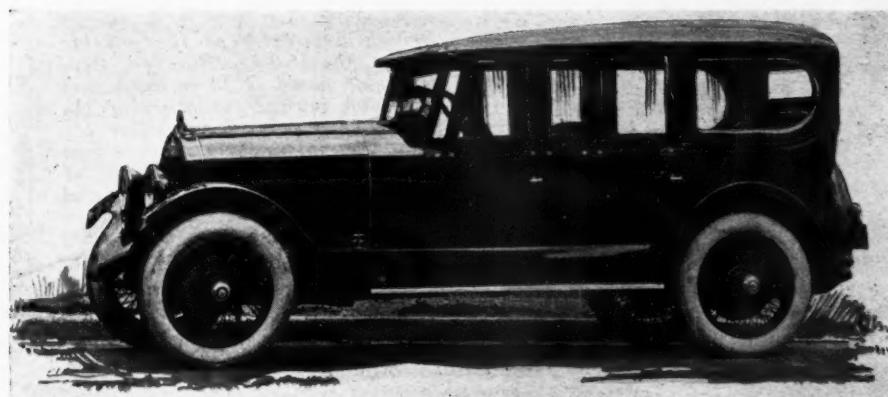


Franklin runabout equipped with winter top

The fabric cover material is colored to harmonize with the body colors, aluminum reinforcement being used to form the rounded corners over which the fabric is stretched. The interior of the top is trimmed with broadcloth and silk roller curtains are fitted to the glass windows of the rear, side and back. The interior lights automatically switch on when the doors are opened.

The roof section covering the rear part that ends at the forward line of the rear side glass window is permanently attached. All forward of this line up to the windshield is removable. The desirable features of the open car are thereby retained and but little work is required to remove or replace the movable portion.

This type of top, which may be considered as an evolution of the so-called California top, is pleasing in appearance and possesses all the advantages that are to be had with the ordinary closed body.



Winter top as applied to Cole touring car

American and British Bodywork at Olympia Compared

A frank criticism of American practice from British standpoint. American bodies said to lack finish and comfort as compared to British product selling in England at same price. Sombre colors and excessive fender clearance not liked. British cars generally have lower seats but thicker cushions tilted toward rear and greater freeboard. Wood or aluminum instrument boards used. Show tendency to shape cowl to give horizontal line at windshield. Adjustable front seats are provided.

By M. W. Bourdon

BRITISH designers may have a lot to learn from Americans concerning economy in chassis production, but the boot appears to be on the other foot when excellence and comfort of bodywork is in question, and it is time American body makers adopted better standards in both respects in their medium-priced cars if they wish to increase or even retain their hold on the British market. That is the conclusion arrived at by the writer after careful comparisons between the American and British bodies at the London Show. It is confirmed by discussions with prospective buyers and other disinterested individuals.

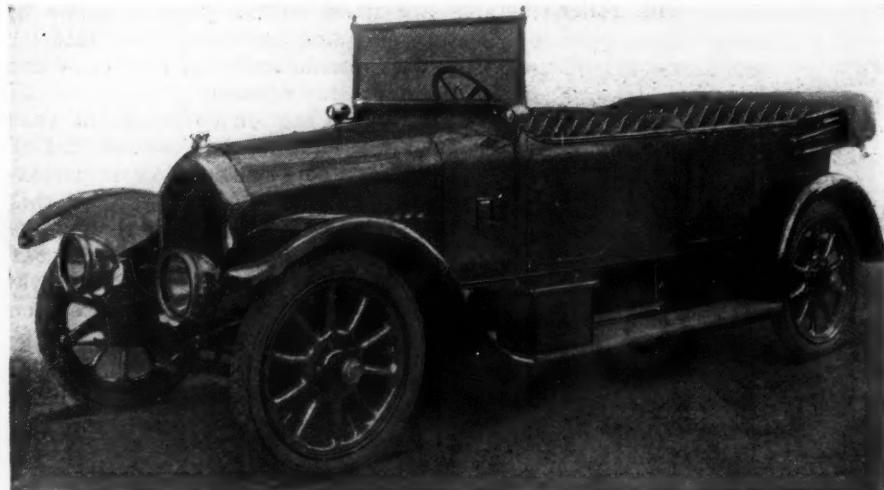
To be quite frank, the American body as known in England is frequently quite unattractive to the British eye, and it does not approach British ideas as to comfort. While present, the faults are somewhat intangible and difficult to define.

In the first place, there is the matter of outline, and here it must be admitted that no great fault can be found with quite a goodly proportion of American cars, their only handicap being their somewhat "lanky" appearance owing to the greater height of their chassis frames from the ground. But this is not a very weighty objection, for it is realized that a generous ground clearance is frequently of advantage, even where good roads are the rule and ruts more than two or three inches deep are exceptional. Never-

theless, the overall height of American cars appears frequently to be greater than is necessary to obtain a specified ground clearance, and there seems to be no reason why 10 in. or 12 in. clearance should not be provided without making the top line of the body 5 in. or so higher than that of British cars with 8 to 10 in. clearance.

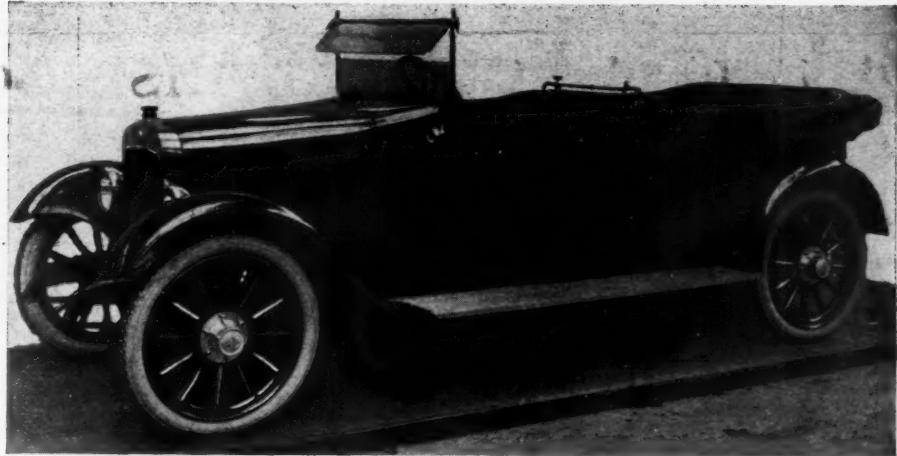
It would appear that American manufacturers deem it necessary to allow very much more clearance between the rear tire and fender than is needed to comply with British requirements. The reason, one assumes, is a desire to prevent contact between the two under peculiarly adverse conditions, while affording a comfortable suspension by the use of flexible springs. But a 10-in. gap between top of tire and top sweep of fender is not pleasing to the eye, especially when, as is generally the case, there is considerably less clearance at the front, and sometimes at the back, of the wheel. If the effects of exceptional road shocks must be provided for, it would seem better to limit spring deflection by buffer springs or rubber blocks, so that the sweep of the rear fenders could more closely approximate to the curve of the wheels. Not infrequently one observed American cars at the London Show with the tire only 4 in. from the fender at the front and 10 in. from it at the top; the British aim is to equalize these dimensions as closely as possible.

Then, in quite a number of American bodies there ap-



British five-seater of the popular design, the 15.9-hp. Humber. Central side panel is 23 in. high and has total inward curvature of 2½ in. below a point 6 in. under top line; ½ in. incurve above that point. Note increased curve of front door to merge into cowl and absence of pronounced line through hood. Blemishes are the heavy bottom frame of windshield and its black irons, the black lining at junction of hood and cowl, footboards too low (only 10 in. ground clearance) and the battery box on step

Phoenix 18-hp. five-seater of somewhat imperfect lines, giving box-like appearance; effect would have been improved by slightly curved side panels in conjunction with a rounded front edge to the radiator. Back of rear seat has harsh appearance, intensified by low level of folded top. Car in reality looks better than in photograph



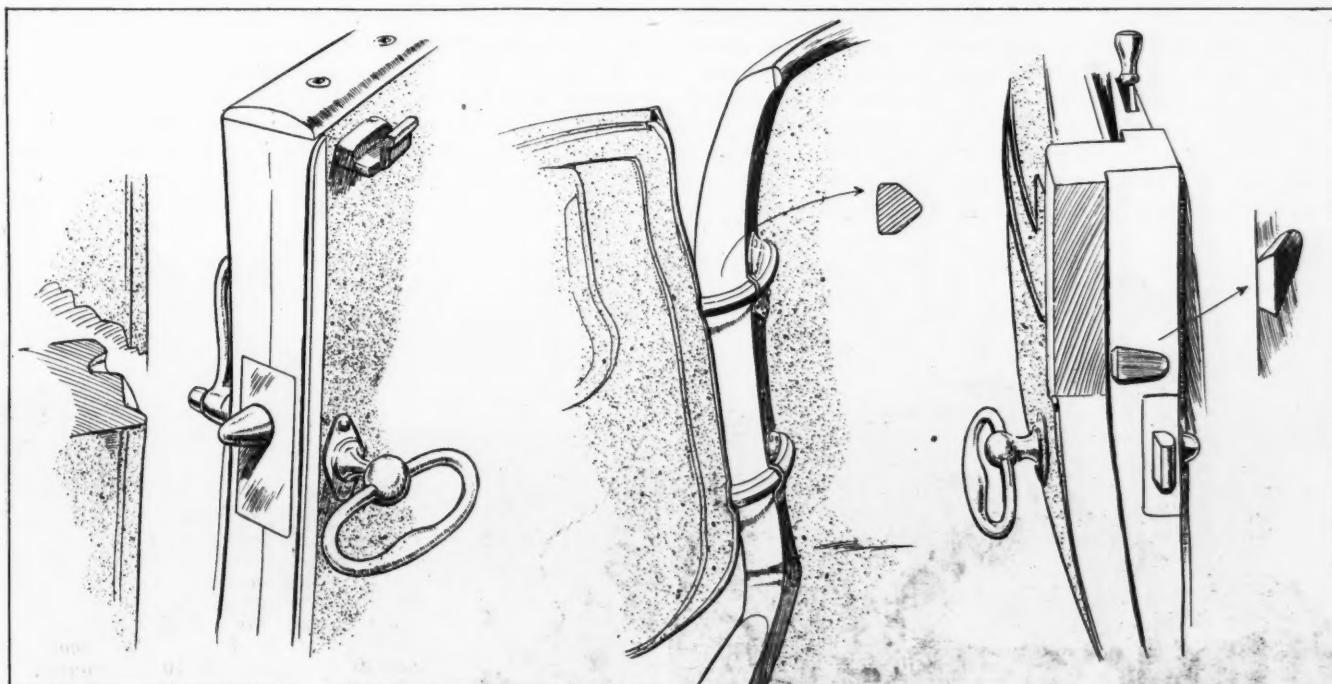
pears to be too pronounced an endeavor to provide a straight-line effect. But it would be unjust to lay this charge generally, for, excepting their height from the ground, the clumsiness of their windshields and their excessive fender clearance, there were American bodies at the show which in symmetry of outline and general appearance (from a distance) were quite in accord with British ideas. A straining after effect, as, for instance, in carrying from radiator to back of car a straight band some 2-2½ in. wide, painted white or other distinctive shade, is noticed in some cases.

Generally speaking, the British idea of symmetrical and "clean" outline is one in which no one feature or part holds the eye. There should be no striking curves. No "forced" straight lines; where the latter occur they should be subdued of themselves and merge without sudden break into other forms. The difference at one part or another may be intangible, but it is very real, nevertheless. One needs almost the eye of an artist to lay a finger on a point of curvature or design that offends the eye; but even an artist with fifteen years' automobile experience failed to

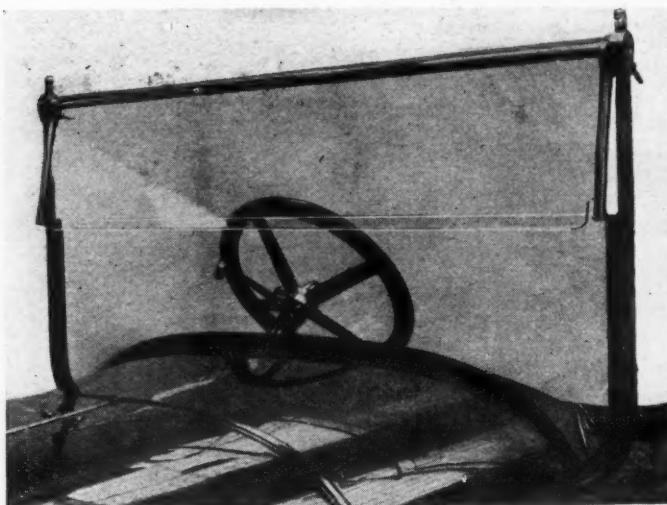
give the writer a precise indication concerning his views of the faults of one such car.

The question of outline may often be connected with that of cost. A taper or curve at one point may involve hand forming the panel in place of rolling it; but that is where the British body builder will not, as a rule, allow cost to prevail; to arrive at the desired effect he does not hesitate to sacrifice economical production—within reason, of course, on standard jobs. Or the attainment of symmetry of outline may and often does necessitate a more elaborate and costly framing to support it, one in which a fair amount of hand planing is needed.

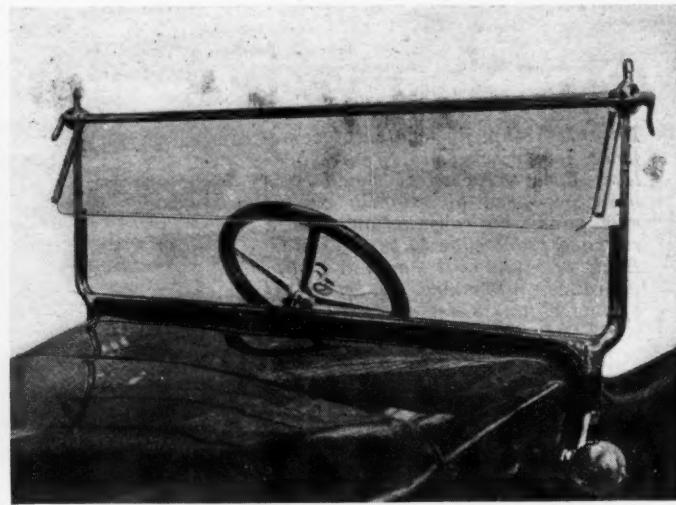
The "tubular" type of body—one with a pronounced rotund appearance in end elevation—is not favored by more than one or two British makers (Angus Sanderson is one of the exceptions), but a slightly curved side panel is of great advantage. A good example in the latter respect has a total curvature of 3 in. at the center panel, but the extreme point of the "bulge" is only some 6 in. below the top edge; from this point to the bottom the panel curves inward 2½ in., so that the incurve of the upper



To the left—Conical door latch used on Standard cars with safety catch shown in section. Cone is spring backed and does not reach limit of travel before bedding home in pillar hole, thus is able to adapt itself to spreading of body frame. Center—Peculiar type of door hinge used on F. N. cars. To the right—Double dovetail block on door engaging with corresponding slot on doorpost used by many British body makers to prevent rattle due to "spreading" and distortion of framework



Unusual design of windshield on Belsize car



Typical British design of windshield

6 in. is but $\frac{1}{2}$ in. The overall height of the panel is 23 in.

No hard and fast rule can be laid down as to the best curvature of panels generally or as to any other point of body design, for the foundation of the whole outline is the radiator. A body which may be pleasing from any aspect with one radiator may with another appear unsightly.

Turning from outlines, it may be said that the average British buyer does not view with approval the somber (usually black) colorings of American cars and the absence of a few brass or plated details. He only just tolerates the black leatherette top which British makers in isolated cases adopt in lieu of khaki or other neutral tint of mohair. He does not object to black lamps against a light body coloring, but these and other fittings finished in that way appear to have a distinctly funereal effect against black or dark bodywork.

But one can excuse departures from British ideas in respect of coloring and lack of relief. Where the English buyer finds most fault is in finish and comfort, or rather the lack of both. He will put up with a somewhat rough exterior finish in mechanical details if they are hidden from view by hood or floor-boards, so long as the chassis is reliable in operation. But he does not like having almost to apologize for the bad fit and rough finish of doors, hoods and bodywork details every time he finds a friend or acquaintance looking at his car. And yet he instinc-

tively feels ashamed of its shortcomings and called upon to make some such remark as "Of course, they could be better, but then they don't affect the running of the car." He would much rather spend another ten per cent on the price of the car and have a finish which would call for no apology but would rather give cause for pride.

For the British user—taken in the lump—likes to have reason to feel proud of his car, and he abhors shoddy workmanship, trumpery fittings and shabby appearance in it, almost as much as he dislikes living in a dilapidated Jerry-built house.

Perhaps the cars shown at the London exhibition do not represent a fair sample of American bodywork, even though there were approximately thirty different makes on view, for there certainly were a few exceptions to the general rule. Nevertheless, the criticisms relate to many offered at \$4,000 and more. It is no good excuse to point to larger engines, six cylinders and so on. The Britisher would prefer to have half an inch off the bore or a couple of cylinders less if he could have the value put into workmanship and exterior finish.

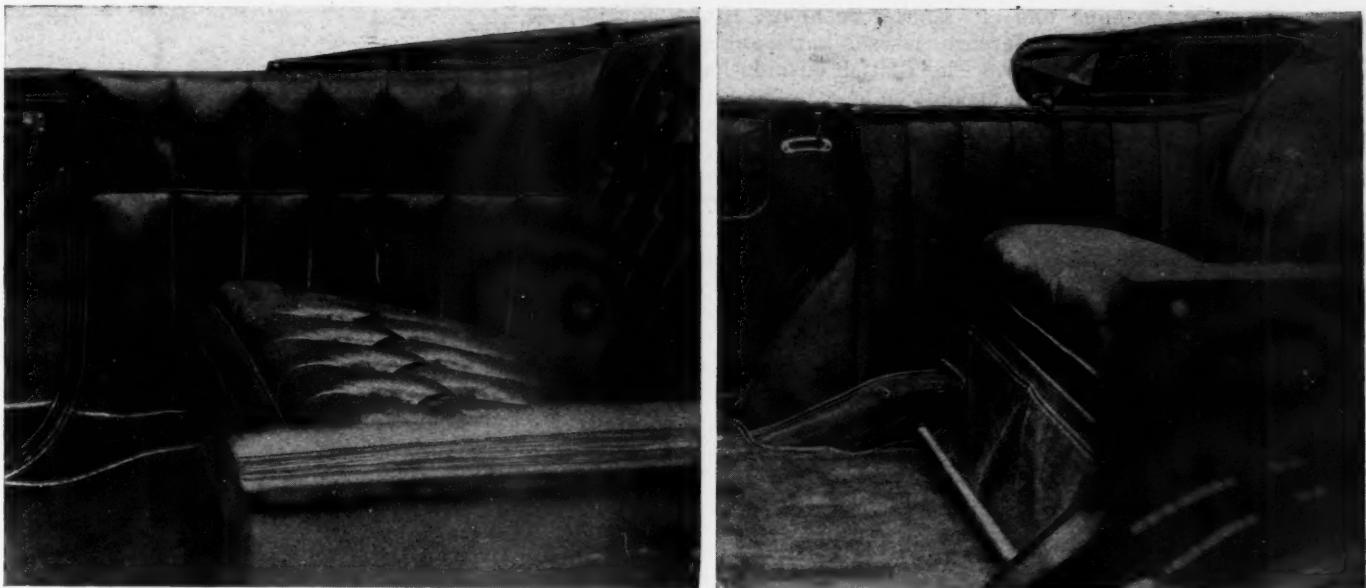
To be specific. The majority of the open-bodied American cars examined at the show had doors which never approached a fit in their openings; there were aching voids up to $\frac{3}{8}$ in. in width. Then, the door pillar fittings—latch hole, dovetail groove, and stop—were as often as not formed as a unit consisting of a roughly made, poorly



Comfort and protection in British bodywork. Note height of sides in relation to passengers' shoulders and compare with companion view of American car sold at approximately same price in England



Sitting ON the car, not IN it. Passengers in American car exposed to elements in bolt upright position because of the shape of upholstery and the high seat. Compare with companion picture



Rear seats of British and American cars compared. The American car (on right) sells in England for nearly \$4,000. Note depth and angle of seats, height of freeboard, etc.

finished and badly fitted steel pressing, not neatly sunk into the pillar but projecting and boldly exhibiting its nakedness. The provision for preventing "chattering" and noise arising from the "spreading" of the body by fore and aft frame distortion was casual to say the least. The door handles and handle groove plates were as roughly finished as though they had just left the foundry or the press and only the hinges came up to British ideas of durability.

Windshields were distinctly cumbersome and crude in outline and had the word "cheap" written all over them. They may be inclined at a jaunty or even useful angle, but their roughly finished fittings must catch the owner's eye every time he glances forward. They may be effective, but they will not bear close examination of their workmanship.

One could continue in this strain almost indefinitely, and the way in which the hood merely "fits where it touches," the roughly finished ends of timber exposed to full view with a dab of black paint intended to cover the raw ends of the grain are among other details with which fault could be found.

It may be truly said that improvement in such matters would add to the cost. But \$150 would go a long way and make the car as a whole appear almost high-grade instead of mediocre or worse. The man in England who buys a six-cylinder or four-cylinder car of 15 to 30 hp. is usually a man of some financial and social standing, and he does not appreciate excellence of performance unless it is accompanied by a presentable appearance. The type of buyer who will put up with poor finish and bad workmanship in bodywork is not after a fair-sized car; in fact, in every type of car buyers want the total cost well proportioned between chassis and bodywork. If they can't have 15 hp. with a presentable body, they will take 12 hp. with an external appearance that will give rise to pride of possession.

It must not be assumed from the foregoing that the writer suggests that all British bodywork is ideal. That is not the case; far from it. But there is apparent a more genuine effort to maintain a good balance between quality in chassis and body. Excellence in those features conducive to smoothness of running is generally accompanied by similar excellence in bodywork. In fact, one might well apply the proverb "A man is judged by the company he keeps" to British chassis and bodies. But apparently American car manufacturers will expend great efforts in

attaining excellence in chassis features with economy in production, only to fit the products of the engineering side of their plants with a superstructure suggesting nothing but a cheap car made by inferior workmen to a crude design.

Perhaps the mentality of American users differs from that of the British; but this is written from the standpoint of the latter for what it is worth. Nevertheless, whether the American user troubles about "finish and fit" of body work or not, he is built like an Englishman and therefore one may surely assume that the ideas of both as to comfort coincide. If that be so, then the American is not, any more than is the British buyer of American cars, being offered a reasonable standard of excellence in this respect.

American bodies are certainly far from comfortable in the estimation of British users. In the first place, one often hears it said that passengers feel they are sitting *on* the car, not *in* it as they do in a home production of normal dimensions. The actual differences between British and American bodies in height of seat; thickness, width and angle of cushion; height and angle of back; and height of body sides may not be great, but they are quite sufficient in the aggregate to make all the difference in comfort.

The following table gives comparative average dimensions of the rear seat, etc., of eight British and eight American bodies of standard design and similar sizes at the London Show; in specially built British bodies, the comfort and protection afforded to passengers is further increased by greater divergencies from American standards as exemplified by the bodies examined:

	Height of uncompressed cushion from floor	Top of cushion to top edge of body	Floor to top edge of body	Effective width of cushion front to back	Depth of 1 cushion 2 in. back of front face
British	in. 12	in. 11	in. 23(a)	in. 21½	in. 9
American	13	8	21(a)	19	7½

(a) Difference increased appreciably in effect by the greater compression from passenger weight of British cushion springs.

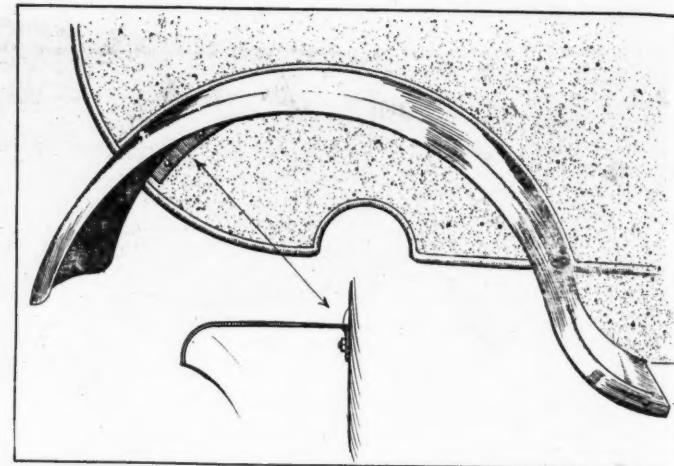
The differences brought out by the above table show that the average British car has (1) cushions slightly lower at the front edge, (2) appreciably greater "freeboard," i.e. height of top edge of body above cushion, (3) higher body

sides, (4) wider cushions and (5) thicker cushions. But where still greater comfort difference arises is in the angles of cushion and back upholstery. The British cushion has regularly graded springs which make it on an average 4 in. higher at the front than at the back, whereas the American cushion is almost flat or, worse still, higher at the center than 2 in. behind the front face. The British back upholstery has similarly graded springs, making it "proud" at the waist line and receding at the shoulder height. In brief, a less upright position is afforded in the British design and the continuous backward slope of the cushion plus the more flexible springs increases the apparent freeboard. As a result the passengers are approximately 6 in. deeper in the body and experience not only greater comfort, but more protection as well. Compared with British body-work that on American cars has been described as "cold," as well as uncomfortable, and the foregoing accounts for this.

Then, too, few British cars of even medium grade have other than leather for the upholstery, though in the less expensive types the covering may be quite thin leather and even imitation. But, leaving the question of material out of account, most British makers favor buttoned upholstery in place of pleated; it is claimed, and apparently with good reason, that buttoning increases comfort, not only because it tends to prevent the passengers from slipping forward or sideways on the seat; but also by adapting itself more readily to the anatomy of the individual. Admittedly, straight pleated upholstery can be quite satisfactory; but it rarely is so. It may be said here that none but the cheapest of British upholstery has other than horse-hair stuffing; fiber and other substitutes are taboo, and the padding is as liberal in quantity as in thickness, the latter varying from 2 to 4 in.

There appears to be very little difference between British and American methods and materials in body framework. For the main members and runners either English or American ash is used; American whitewood for the lining and boards of the less expensive bodies, cypress for the better ones. Aluminum is rarely used for panels, lead coated steel sheet being preferred even in bodywork of the best quality. Panels are rolled, and welded at joints in stock jobs.

There is no standard as regards the finish at the top of the sides; as often as not the upholstery is carried unobtrusively (not with the bolster-like effect at one time favored) over to the outside edge and finished off with a metal beading, one alternative being a strip of mahogany

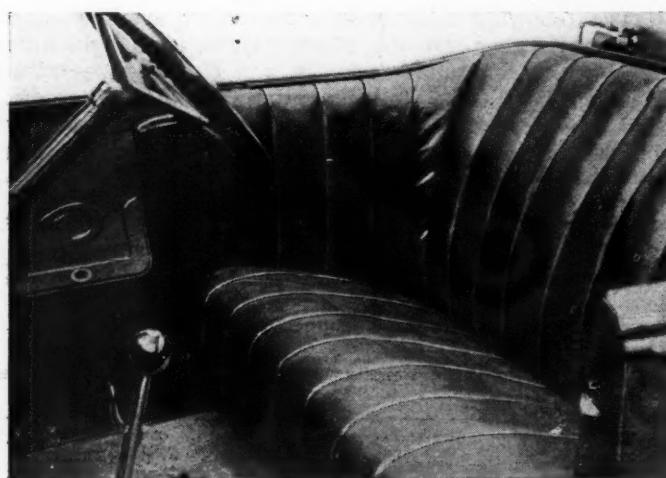


In isolated cases, British makers endeavor to eliminate fender stays by fastening an inner lip to the body side as indicated above

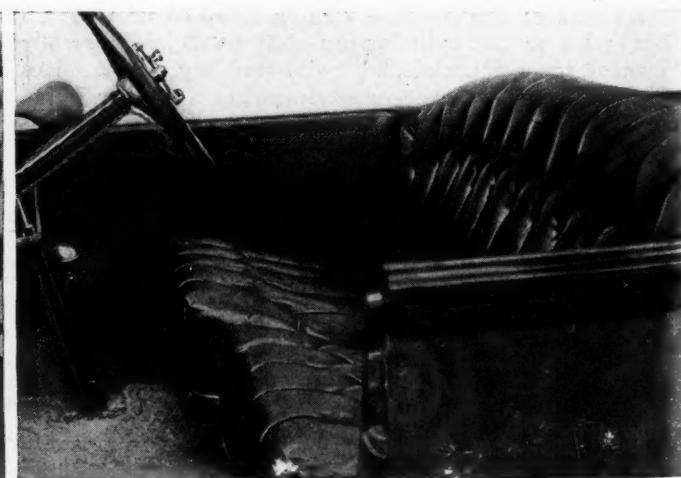
along the top and another a continuation inward of the side paneling. Projecting door hinges are used quite as often as the concealed type.

On British cars instrument boards of aluminum, but of less elaborate design and with fewer fittings than those of the "super grade" cars, are becoming quite normal, even in small and comparatively low priced chassis. But a mahogany or walnut board is still more general, and, when the fuel tank is relegated to the back of the car by the use of vacuum feed, cupboards or drawers under the scuttle for small parcels, gloves, etc., are often provided. Flush fitting instruments with plated or brass edgings are normal, but no endeavor has been made to adopt the pressed sheet board of American practice.

The fixed standard two-panel windshield is rapidly displacing the single panel hinged pattern at one time so popular. Both panels are sometimes adjustable, but more often the bottom one is a fixture, arranged vertically with the upper one overlapping it when it also is vertical. No attempt has been made to follow the American type of curved corners of the glass frame; the latter in British cars usually consists of two vertical tubes surmounted by a stud or socket for securing the front edge of the folding top; the upper panel pivots at its top corners and has a tubular top rail and rectangular channel sides for holding the glass. Rubber strips to form an overlap for the



One of the few examples of pleated (as opposed to buttoned) upholstery in British cars; the 18-hp. Phoenix. Note angle of back and cushion, depth of latter 10 in. and height of body side (23 in.)



Driver's seat of 12-hp. Rover is 2 in. deeper than that of his companion. Allows easier exit and entrance by left side door and additional comfort in the one case. Fibre mat is standard

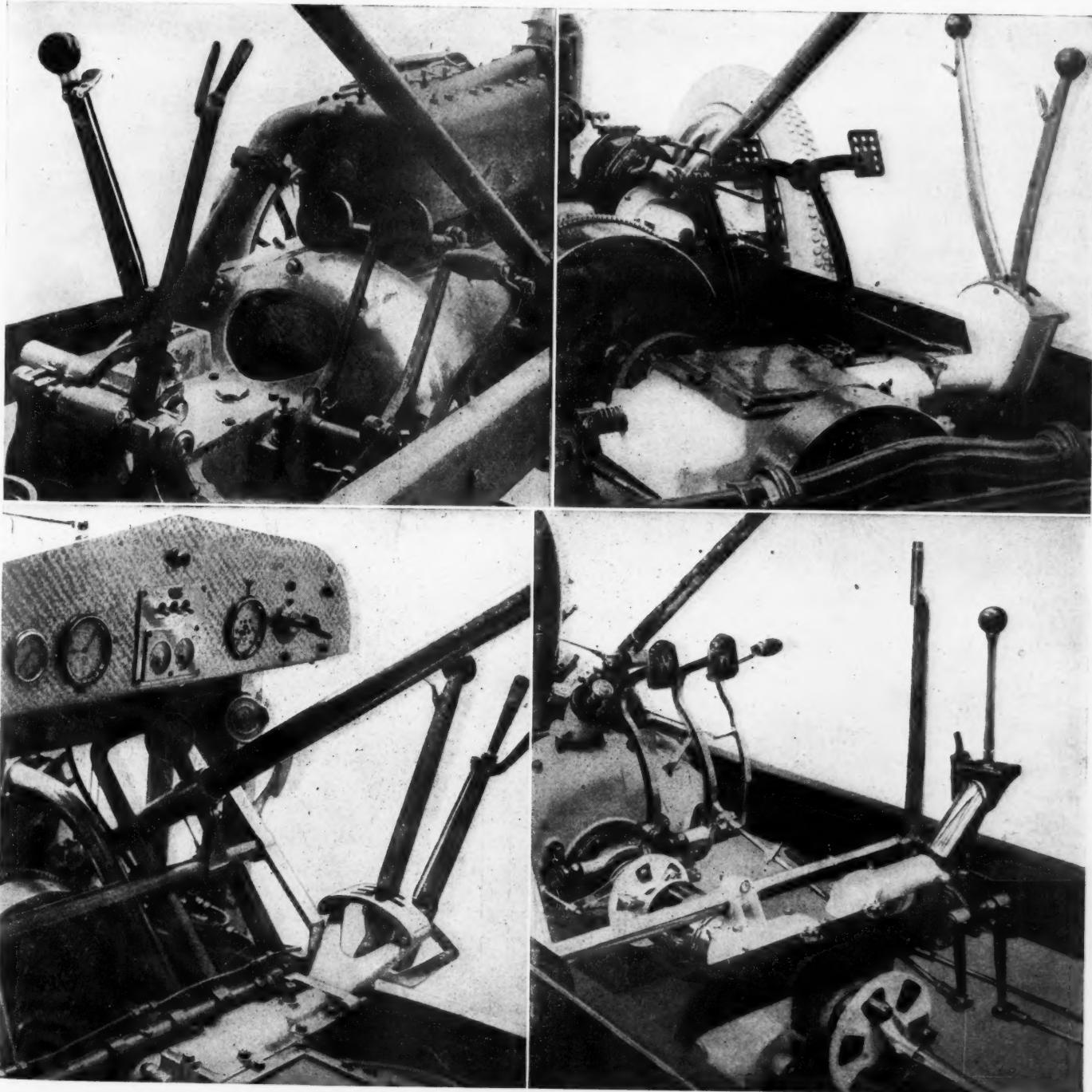
panels are not used, the close fit of the two or their overlap being considered sufficiently effective, and neater. When the cowl is crowned a mahogany strip is generally used between the cowl and the lower panel, without rubber packing, the glass frames being rectangular. But there is a distinct tendency to shape the cowl so that it has a horizontal or almost flat rear edge to avoid the need for a filling strip between it and the windshield. But it is very difficult to make a cowl of this pattern merge with an easy sweep into the body sides.

To exclude draughts a three-fold strip of fabric is often secured between the top edge of the windshield and the front stick of the folding top.

Front seats are frequently adjustable fore and aft even

in open bodies. Austin has this provision with the two seats formed as a unit secured in position by a peg extending down into sockets and operated by a hand lever projecting forward between the two occupants. The new Standard has separate adjustable front seats with a T headed locking screw passing through a slot in the base-board and screwing into one or the other of two threaded sockets in the floor, the screw head being accessible through a hand hole in the cushion board. In this case the backs are hinged to provide more space for entering the rear compartment and are formed of metal frames with a laced fabric band around them and a padded squab which is suspended from top of frame by an inverted pocket at the rear. There are no springs in the back.

Control Systems Used on British Cars at Olympia



Upper left—Austin. Upper right—Humber. Lower left—Guy. Lower right—Wolseley

Floatless Carbureters Coming Into Use in Germany

The kind and quality of fuel available for automotive vehicles in Germany during and after the war has caused most attention to be given to the carbureter and its problems. This article discusses the developments in that country and the conclusions of motor users.

By Benno R. Dierfeld*

UNDoubtedly the float with its actuating mechanism is one of the most delicate parts of the conventional type of carbureter. The soldered float, built up of very light brass stampings, is not sufficiently rugged to withstand the oft repeated "tickling"—resorted to by the driver in order to facilitate starting of the engine—and becomes leaky. The cork float, on the other hand, which is generally used only on the cheaper makes of car and is practically unknown in Germany, has a tendency to become soaked with fuel.

Both types of float possess the disadvantage that they will tilt and stick on heavy gradients or in consequence of road shocks, whereby the flow of fuel through the nozzle is disturbed. If the float chamber is located at the side of the mixing chamber, as is usually the case, any strong inclination of the carbureter will result in a

*Mr. Dierfeld is rated as one of the leading German writers on automotive topics and much of his work is familiar to readers of AUTOMOTIVE INDUSTRIES.

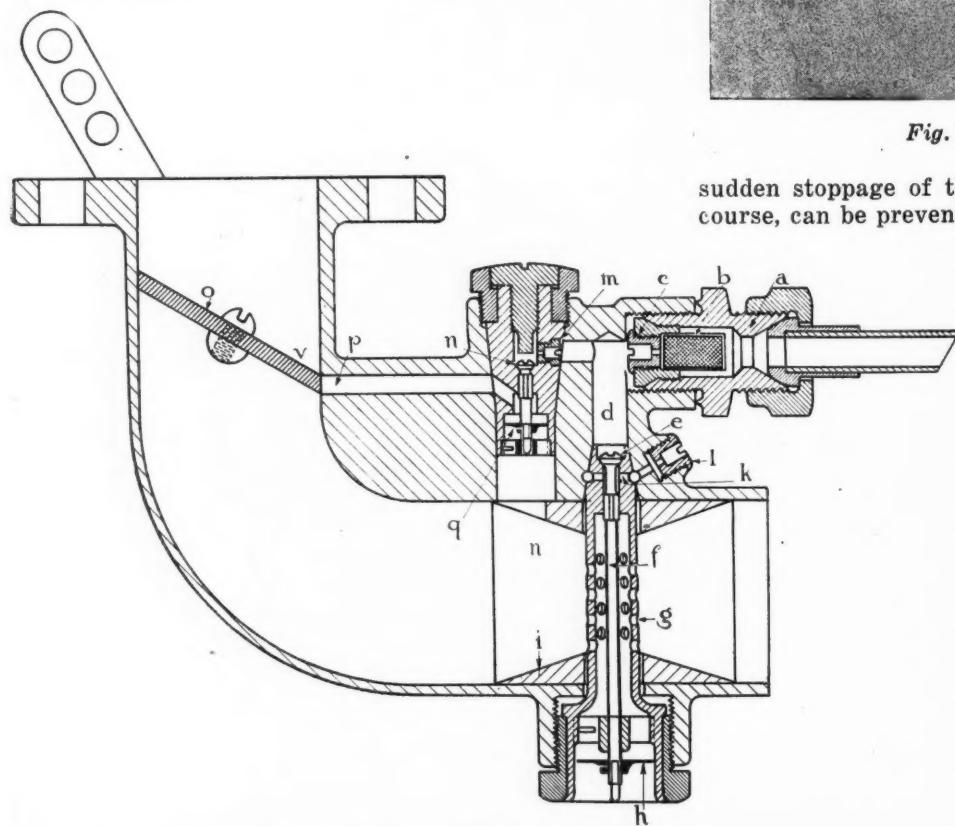


Fig. 1—Section through Tuto carbureter

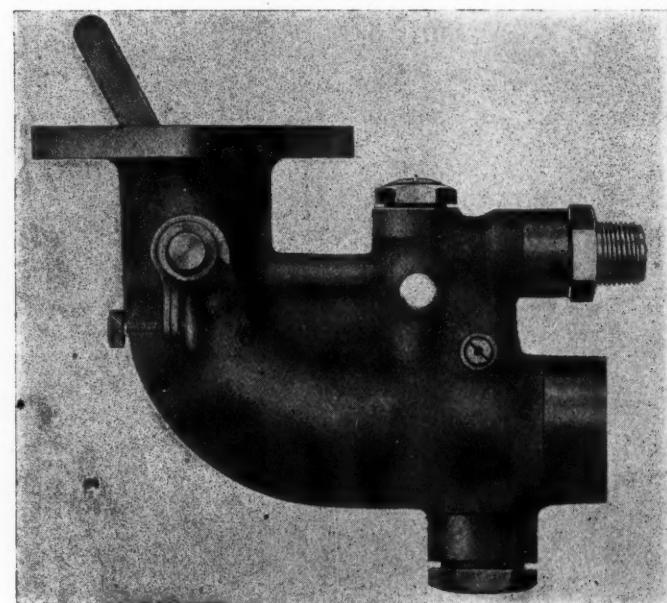


Fig. 2—Tuto carbureter

sudden stoppage of the fuel delivery. This trouble, of course, can be prevented by arranging the float chamber and mixing chamber concentrically, but this construction is expensive, and the fuel nozzle and other delicate parts are thereby rendered less accessible.

Last, but not least of the disadvantages of the float are that the float valve must be adjusted whenever a change is to be made in the kind of fuel used, and the fuel supply in the float chamber is a constant source of danger, for when the engine fires back through the carbureter, this fuel may be ignited, and numerous car fires can be traced to this cause.

These disadvantages are eliminated in the floatless carbureter, which, moreover, is more compact and lighter than the conventional type and gives uniform results both on automobiles and airplanes, irrespective of the inclination of the machine. In air-

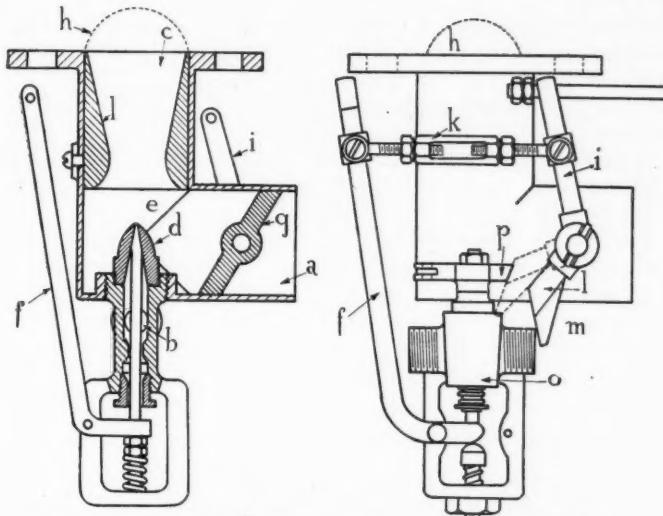


Fig. 3—Section through Drego carbureter

Fig. 4—Drego change-over mechanism

plane work such carburetors are required when looping is to be attempted, while for automobile work the floatless carburetor is most advantageous for driving in very hilly country.

The general principles of the floatless carburetor are not unknown to readers of AUTOMOTIVE INDUSTRIES, for in the article on the Maybach aircraft engine, in the issue of Nov. 14, 1918, there appeared a detailed description of the Maybach floatless carburetor, which has thoroughly proven its practicability on numerous German airships and airplanes. This carburetor, however, is of rather complicated design and is seldom used in automobile work. At present there are a number of simpler and most promising designs of floatless carburetors on the German market which are suitable for automobile as well as for airplane service.

Floatless Carburetors Extensively Used

The Tuto carburetor was extensively used during the war and apparently with good success, for according to the manufacturer no less than 16,000 of these carburetors were sold in a single month. Fig. 1 shows a sectional view of this device. The fuel enters at A, passes through the strainer B, and on through the interchangeable main nozzle C, filling the space D above the fuel shut-off valve E, which has a conical seat. The stem F of this valve extends through the perforated main nozzle tube G and carries disk H at its lower end.

During the suction stroke of the engine there is a strong vacuum in the venturi tube I, which is communicated through the perforations of the main nozzle tube G to the disk H. As a result of the suction on disk H, valve E is lifted from its seat, and fuel is then drawn into the main nozzle tube G. A correcting stream of air enters through the openings K, and the amount of this air is regulated by means of the interchangeable correcting air nozzle L. The correcting air atomizes the fuel and the mixture of fuel and air in the main nozzle tube G is more thoroughly broken up by the main air stream which passes through the venturi tube I at high velocity.

In case the engine stalls or is stopped by means of the ignition switch, the vacuum in venturi tube I ceases and the disk H no longer being under the influence of suction, valve E closes under the action of gravity and no more gasoline can flow into the carburetor. In case of a back fire through the carburetor, the pressure developed in venturi tube I forces down disk H and therefore automatically shuts the fuel valve E, whereby fire in the carburetor is prevented. In order to facilitate starting

of the engine, a special idling device is provided, which operates on the same principle as the main nozzle. The fuel flows through the pilot nozzle M, to the pilot valve N. If throttle valve I is nearly closed, when the engine is being cranked a very strong vacuum is formed in the idling channel P, in consequence of which disk Q is lifted and valve N opened. The air necessary for forming a combustible mixture enters around the outside of the disk and mixes with the incoming fuel around the stem of valve N, producing a rich mixture, which is favorable to easy starting. If throttle valve O is opened farther, the vacuum in the vicinity of the valve at V will decrease and at the same time the vacuum in the venturi tube I at U will increase. As a result of this change in pressures, the suction on disk Q of the pilot valve N is reduced and the latter closes. Thus the idling device is automatically put out of action as soon as the main nozzle begins to operate.

Details of Floatless Types

In Fig. 2 is shown an outside view of this carburetor, which brings out its compact form. On some engines the type illustrated cannot be used, on account of lack of sufficient space; for such cases a vertical type is made, which is identical with the type Fig. 2, except that a throttle valve is fitted into a straight, upward extension of venturi tube I.

Fig. 3 represents a sectional view through the standard type of Drego carburetor, which has no float and only a single fuel nozzle E. The fuel enters at B and is sprayed through the nozzle E. Fuel delivery is controlled by a needle valve D which is acted upon by a bell crank lever F. Air enters at A and passes through the throttle valve G, which is operated by means of lever I. Above the fuel nozzle is located the venturi tube L, at the top of which there is a hemispherical wire gauze strainer intended to more intimately mix and atomize the fuel. Levers F and I are connected together by an adjustable link (not shown) in such a manner that they can be moved simultaneously or separately, and that the needle valve D in the fuel nozzle opens a trifle earlier than the throttle valve G.

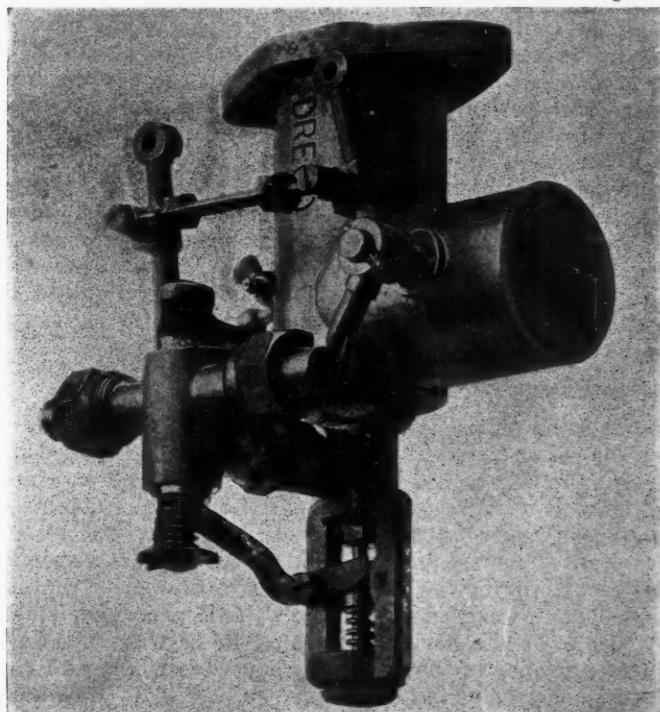
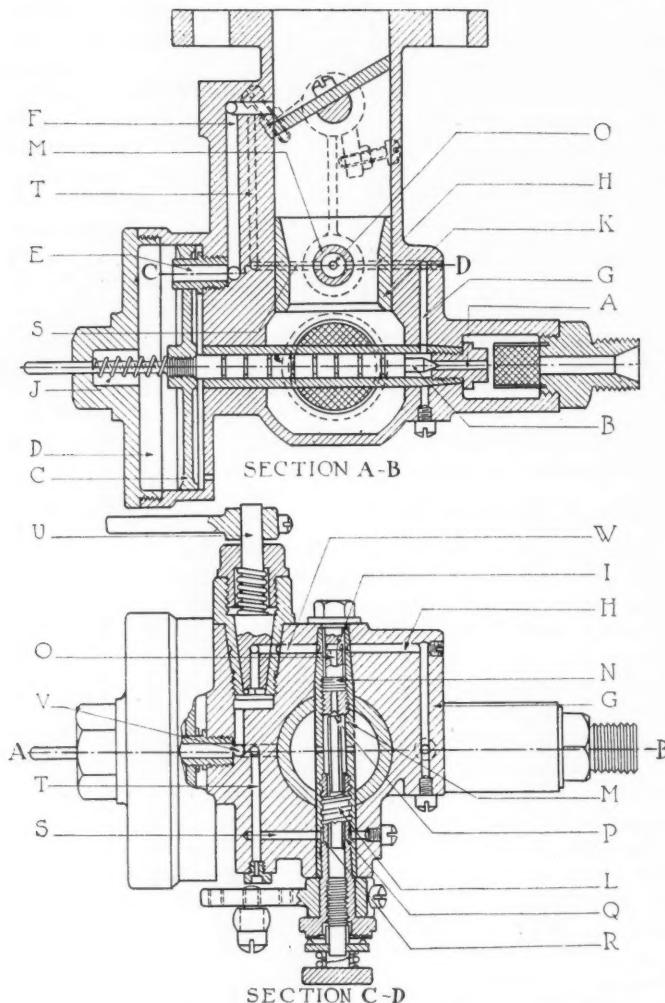


Fig. 5—Drego bi-fuel carbureter



Figs. 6 and 7—Sectional views of Adria carburetor

When the engine is at rest the spring below the bell crank F presses the needle valve into the fuel nozzle E, thus shutting off the fuel flow. While the engine is running the fuel nozzle is constantly cleaned by the moving needle valve. Owing to the fact that the nozzle E is located between the throttle valve and the engine inlet valve, the suction on it in starting will be much stronger than with the conventional construction, and the engine will therefore start more readily. In ascending steep hills it is possible to enlarge the fuel opening alone, thus obtaining a stronger mixture and increasing the power of the engine without increasing its speed. While coasting the fuel may be entirely shut off, so that none will be wasted. Of course, a skillful driver is required to properly operate the fuel nozzle and throttle valve for best results.

Drego Carbureter

The same principle is embodied in the Drego carbureter for super-compressed engines (engines using a compression of 120 to 130 lb. per sq. in.) which run on crude oil, gas oil mixtures, etc. It is impossible to start these engines directly on the heavy oil; for starting, either gasoline or benzol is used, and by means of a special device the engine is throttled down so that the compression does not exceed the normal. This is accomplished by means of the device illustrated in Fig. 4. The carbureter proper is the same as above described, and the letters have the same significance as in Fig. 3. However, the throttle lever is provided with an extension L which strikes the end of handle P of the two-way valve O,

whereby the opening of the throttle valve is limited. This occurs only as long as the two-way valve is set for gasoline. As soon as the engine is sufficiently warmed up the valve is turned so as to admit heavy oil to the engine and the throttle valve can then be fully opened. In Fig. 4, K is an adjustable link connecting the throttle lever I with the fuel valve bell crank F. Fig. 5 shows a photographic view of this carbureter.

The above described designs of carbureter resemble the standard type in that fuel must be fed to them either by gravity, pressure, or suction. The following types differ from the preceding ones in that they incorporate also a fuel feed, that is, they combine a floatless carbureter and a fuel feed device, working on the vacuum principle.

Vacuum Feed Carbureters

Figs. 6 and 7 illustrate the Adria combined floatless carbureter and vacuum fuel feed. In the upper part of the carbureter housing is arranged the throttle valve in the usual manner, while in the lower part of the housing is the automatic fuel valve, which, when the engine is cranked, is opened by the suction in the carbureter. This fuel valve consists of interchangeable valve seat A and the valve B, the stem of which at its left end is provided with a large disk piston C, adapted to slide in chamber D. This chamber communicates with the space above the throttle valve by channels E and F, hence, in case the engine is cranked up, if the throttle valve is closed, or nearly so, a vacuum is immediately created in it. Piston C is immediately drawn outward and the fuel valve is withdrawn from its seat, in consequence of which fuel enters through the fuel supply tube and the strainer. The fuel flows through passages G: H and through the small drill hole I into the main nozzle. While the engine is standing, spring J presses valve B against its seat, so that no fuel can flow through passages G and H, and consequently the fuel in the fuel supply tube cannot return to the fuel tank, which is located lower than the carbureter. Where the carbureter is used in connection with gravity or pressure feed, the fuel can neither flow through the nozzle or return to the tank, and in consequence there is always a certain amount of fuel at the orifice of the main nozzle, so that no difficulty is encountered in starting the engine.

Fuel Throttling Device

The fuel throttling device is arranged in the venturi tube K parallel to the throttle valve. This throttling device is provided with coarse thread L, and is operated by a link and lever connection to the throttle lever. This fuel throttling device consists of a horizontal tube M, provided with small radial holes; the main nozzle N is screwed into the tube M, and communicates through passage I and channels G and H with the fuel valve A, as already mentioned. The nozzle O is opened or closed by means of the linkage acting on the conical valve P. The latter is so adjusted, by means of the thread on its stem and a locking device, that for small openings the fuel feed is just sufficient for idle running of the engine.

When the engine is idling, fuel leaving the orifice O mixes with a certain quantity of air entering through passages Q, R, S and T, the latter of which discharges into the inlet manifold above the throttle valve. In order that the air may be mixed with the proper quantity of fuel for any throttle position, the fuel throttling device is so arranged that by means of the coarse thread L and the internal thread of tube M, conical valve P can be opened or closed as above described. The head of valve P connects by a link with the throttle valve lever and to

each position of the throttle valve corresponds a certain position of the fuel valve P. The throttle and fuel valve levers are both provided with a number of holes, and can be shortened or lengthened, whereby a corresponding adjustment is effected. The carbureter has a starting valve U by means of which the vacuum passage V can be shut off from the fuel passage W, if fuel is being drawn in. To prevent a return of the fuel to the tank, which is located at a lower level, a check valve must be provided at the lowest point of the fuel system.

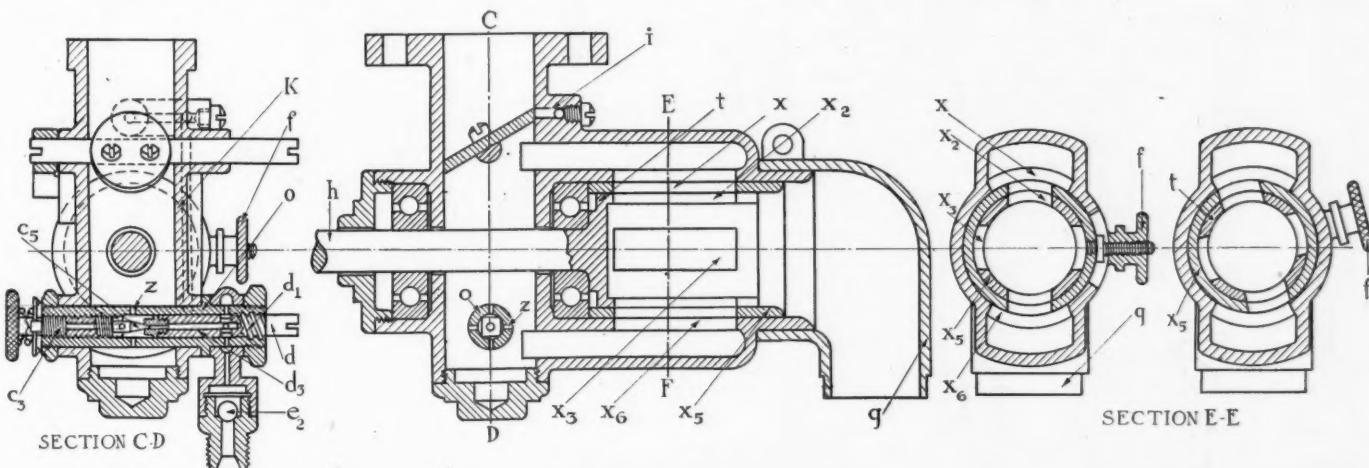
For use in connection with the heaviest grades of fuel, such as crude oil mixtures, a new carbureter has been designed by engineer Graczyk, formerly designer of the Tuto Carbureter Co. and at present chief designer of the Adria Carbureter Co. Referring to the sectional views, Figs. 9-11, shaft H of the rotating valve T is driven at one-half crankshaft speed, and for use on a 4-cylinder engine is provided with four valve ports, X₁, X₂, etc., for the main air, which enters through the right angled elbow G. Valve T rotates continuously; during the first part of the suction stroke, when the ports of this valve are closed, fuel enters the carbureter chamber through holes Z and a little air through the central hole of the fuel valve C, while during the remainder of the suction stroke, when the ports X and X₂ are open, the greater portion of the air required by the engine is admitted through them.

As during the first part of the piston stroke the interior of the carbureter is closed against the atmosphere, a very strong suction is created, which is sufficient to elevate the fuel up to the nozzle openings Z, but as soon as rotating valve T opens the air inlet, the vacuum drops considerably, and no more fuel enters through nozzle Z.

Atomizing the Fuel

Another object in admitting fuel and air separately during successive periods is to provide a uniform and thoroughly atomized mixture, for the air, entering through the central hole of the fuel valve C, has a very strong atomizing effect, as a result of the vacuum existing in the carbureter chamber. Between the walls of the carbureter housing and the rotating valve T is inserted a sleeve X, which can be rotated by means of knob F, guided in a slot of the carbureter housing, and serving to adjust the maximum cross-section of the air passage.

In the upper part of the vertical carburetor chamber is arranged the throttle valve and in the lower part is the fuel nozzle which consists of a transverse tube O, and the fuel jet proper D. The fuel enters through the



*Figs. 9 and 10—Sectional views of Graczyk rotating valve carburetor.
(This carburetor draws fuel directly from a tank at a lower level)*

Fig. 8—*Adria carbureter*

ball valve E, actuated by the vacuum in the carbureter, and passes through the nozzle D, the orifice of which can be closed by the valve C. The nozzle D is squared on the outside, hence there is a passage between it and the tube O, and at idling speeds of the engine the fuel flows through this space to the passage K discharging near the throttle valve. Owing to the position of the throttle valve in idling, the fuel suction of the engine can never act on the mouth of passage K. When the throttle valve is farther opened the fuel is drawn in through holes Z of the main nozzle.

When the throttle valve is opened the fuel nozzle orifice must be opened correspondingly, and fuel nozzle D_3 is not fixed in tube O , but can be turned and axially moved by the coarse thread D , with an extension D . To this extension a lever is secured, which is connected by an adjustable link with the throttle lever.

THE wooden steering wheel rim is little used on British cars, the type most favored being a cast aluminum frame with the rim coated with black xylonite or non-inflammable black celluloid. One variation has a built-up frame with aluminum boss and spokes and a rim of steel tubing similarly coated and usually knurled or slightly fluted to afford a better grip.

Fig. 11—Mechanically operated mixture and fuel throttle of the Graczuk carburetor

Another French Car Using Brakes on Four Wheels

Darracq now getting into production on eight cylinder car, which has been modified since exhibit at Paris Salon a year ago. Engine has removable heads and uses battery ignition. Four speed transmission and spiral-bevel final drive employed. Right hand drive retained.

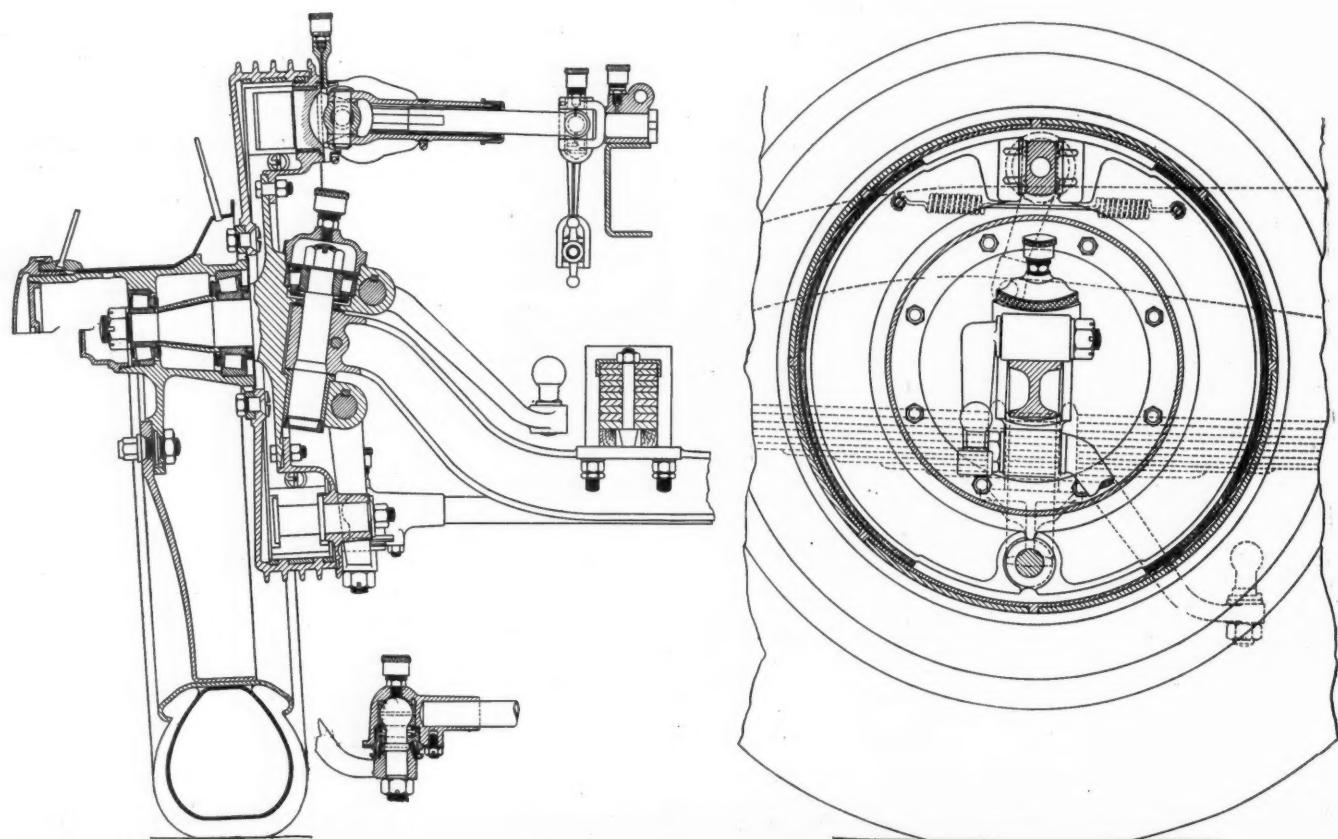
By W. F. Bradley

DARRACQ is just getting into production on the eight-cylinder automobile which was exhibited at the Paris Salon a year ago. After the show season this car was sent back for further experiments and tests and it comes forth now, not only with various improvements, but fully completed for production on a big scale.

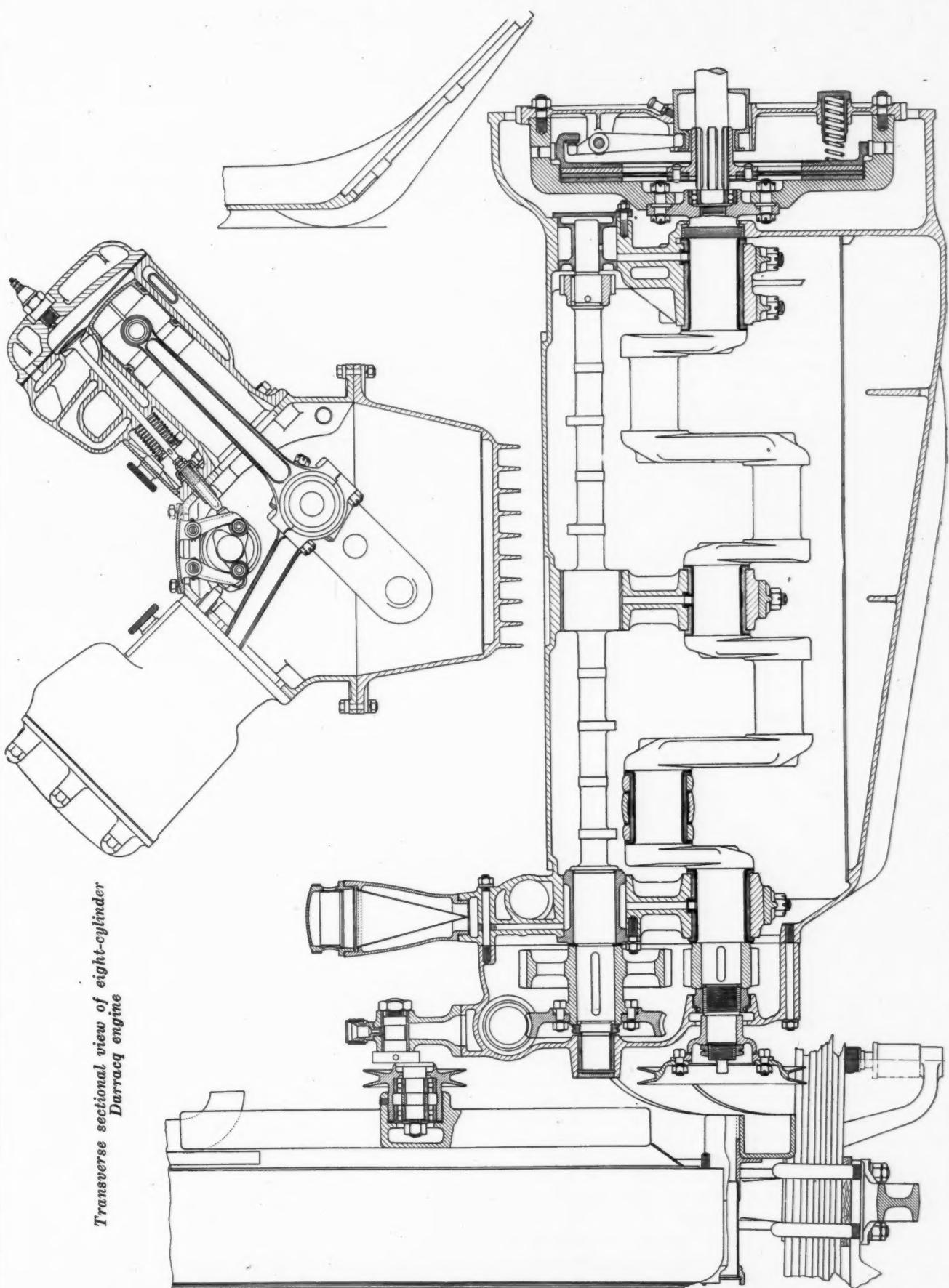
The most important change on the new Darracq is the adoption of brakes on all four wheels, under Perrot license. While the general design is the same as that of the Delage and Hispano-Suiza brakes, the Darracq has distinctive features and has been laid out very carefully with economical production in view. The brake drums are ribbed and cast aluminum, with cast iron liners let in, and the shoes are also aluminum with Ferode facing. The two sets, for front and rear wheels, are identical and interchangeable, the dimensions being 16 in. diameter and 2 in. face width. Operation is by means of a pedal, but the side lever also

locks the brakes and is intended for use when the car has to be held in a standing position.

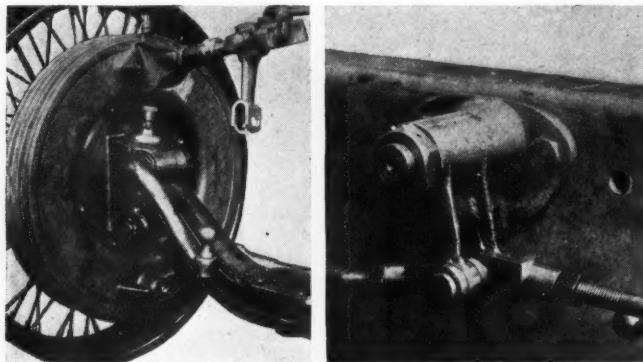
One of the distinctive features of this braking system is the absence of any equalizer. From the brake pedal connection is made by rod to a lever mounted on a main brake shaft set across the frame. This shaft has mounted on it six levers: two (one at each extremity) for the front wheel brakes, two for the rear wheel brakes, one for the pedal, and one for the hand lever. The connection from the main brake shaft to the wheels is in two stages for both front and rear, in order to avoid the use of rods of unusual length. In the case of the brakes on the front wheel, the connecting rod runs from the lever on the main brake shaft to another lever mounted on a bracket bolted to the frame about on a line with the radiator. From here a second rod runs forward to a lever on the camshaft for the front wheel brake. This camshaft is telescopic and



Front wheel brake and operating mechanism used on Darracq car



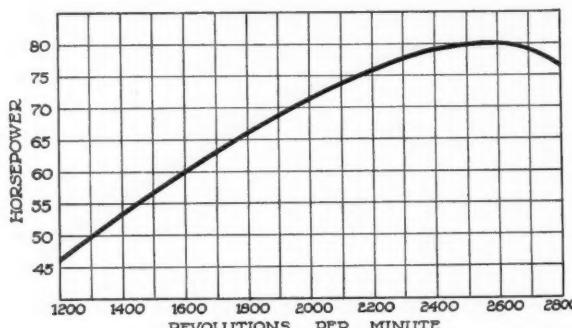
Longitudinal section of crankshaft and clutch, showing also arrangement of gears used for driving lighting generator and water pump



External view of front wheel brake and linkage on chassis frame for operating brakes

has a universal on its inner end mounted in the radiator trunnion bracket, as shown in the illustrations. Each brake has to be adjusted specially, this being accomplished by four winged nuts, two of them being alongside the frame members, in front, and two below the rear axle. They are set so that the pull is applied equally on all four wheels. Experience has shown that when once set the brakes wear evenly, and when wear does take place an equal number of turns on each of the adjusting screws will return them to their original condition. The writer has tested these brakes on a car fitted with a heavy sedan body, carrying six passengers, for a distance of 1000 miles over fast and mountainous roads, without having to make any adjustment on the brakes and with perfectly satisfactory results.

The front axle has been specially designed with a view to withstanding the extra stresses imposed by the use of

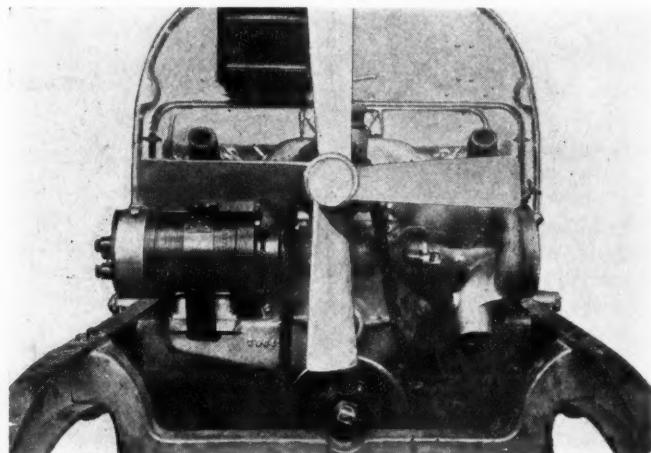


Horsepower curve of eight-cylinder Darracq engine fitted with special camshaft giving a valve lift of $13\frac{1}{2}$ in.

front wheel brakes. The steering pivots are inclined and are mounted with taper roller bearings.

Outside the braking system, only detail changes have been made in the chassis. The engine has 2.9 by 5.1 in. cylinders, with detachable heads, and develops 79.9 hp., with the peak at 2600 r.p.m. Delco ignition is used to the exclusion of the magneto. Connecting rods are forked type forgings and aluminum pistons are now employed. The carburetor finally adopted is the English Smith multiple jet, with hand controlled additional air inlet, with which the average gas consumption is one American gallon per 14 miles for open bodies and 12 miles for the sedan.

The powerplant is a unit construction. The transmission has four forward speeds and reverse and the final drive is by spiral bevel gears. In accordance with Amer-



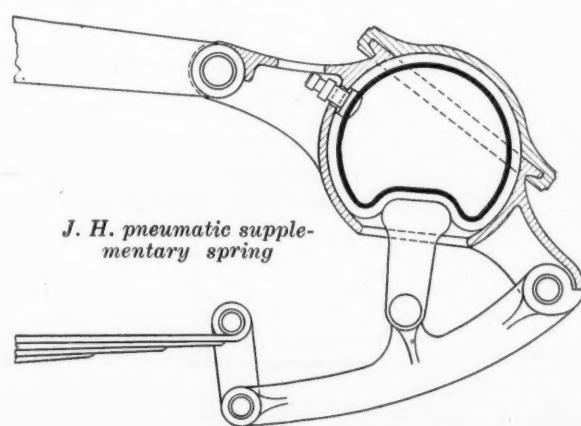
Front view of Darracq eight-cylinder, showing cross shaft operating water pump and lighting generator

ican practice, the gear-change lever is mounted directly on the gear box, but right hand steering is retained. Timken roller bearings are used both in the gearbox and the rear axle. The propeller shaft is of the open type with two universals. The rear axle housing is composed of two steel stampings welded together to form a banjo casing. Both the forward housing, carrying the driving pinion, and the rear cover are aluminum castings. Suspension is by semi-elliptic springs in front and cantilevers at the rear. These latter have double attachment to the bronze bushed spring pad on the axle, both the main and the secondary leaf having eyes rolled on their ends. Rear springs are $2\frac{3}{4}$ in. wide.

Swiss Pneumatic Spring Introduced Here

AT various times in the past supplementary spiral springs have had considerable vogue in automobile practice, having been used first in the open and then in the closed form. For some cars, notably the Ford, these springs are still being sold in considerable numbers and are often incorrectly referred to as shock absorbers.

A pneumatic supplementary spring developed in Switzerland and known as the J. H. has been brought to this country by Walter A. Wetterwald. Its design will be readily understood by reference to the accompanying sectional view. The advantage of the pneumatic over the steel supplementary spring is that the effect of the former can be readily varied by inflating to a higher or lower pressure. Since the inflation pressure is much lower than that of tires, loss of pressure is slower.



Reactionary Country Exports Radical Car

German built Sauer has constant mesh gears with positive clutches controlled by hand selector mechanism. Gear change effected by operation of clutch pedal. Roller worm-wheel used in final drive.

ACAR imported into this country from Germany by Mazzoli & Schendel, Inc., known as the Sauer, has some features which are rather radical in motor car practice. Chief among these are an automatic mechanical gearshift and a worm-roller wheel drive. Control is entirely by pedals, there being no control levers on the car. There are three pedals, similar in design and mounted concentrically, for the clutch, the service brake and emergency brake respectively.

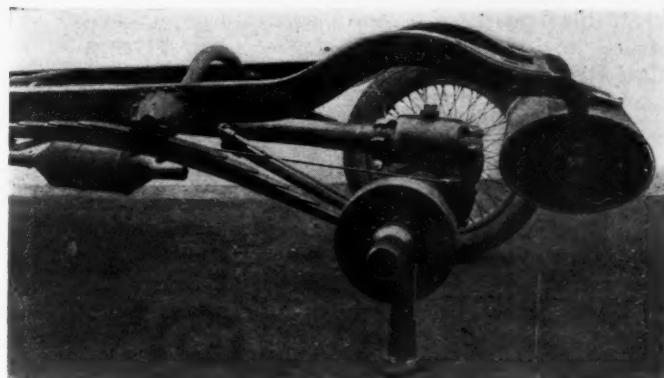
The car has a four cylinder engine of 80 mm. bore and 130 mm. stroke (3.15 x 5.12 in.). The wheelbase is 124 in. The carburetor is a Pallas-Zenith, with horizontal outlet, vacuum feed from a 15 gal. rear tank, and hot air supply. Ignition is by high tension magneto and lubrication by the circulating splash system.

Back of the flywheel the design of the car is decidedly unconventional. There is a multiple disk-in-oil clutch in the flywheel. The transmission is located amidships.

The gearset affords four forward speeds and a reverse. Gears are not shifted into and out of mesh but remain in mesh constantly. They are locked to the shaft and freed from it as desired by positive clutches of the internal and external gear type. Control of the gears is effected by means of a selecting mechanism in conjunction with the clutch pedal, the principle being somewhat similar to the magnetic gear shift quite familiar to American engineers. In the car here illustrated the selector lever is mounted on the instrument board, but this feature will be changed, and in future it will be mounted on top of the steering wheel on a stationary sector. The driver can set the selector lever at any time. For instance, while driving on high gear on the level, when seeing an upgrade in the distance, he can set the selector in the third speed position. Then, when he reaches the grade and his engine slows down in consequence of the increased traction resistance, he simply depresses the clutch pedal, whereupon the fourth gear or direct drive is disengaged and the third gear engaged automatically. The driver then releases the clutch and the car continues on the third

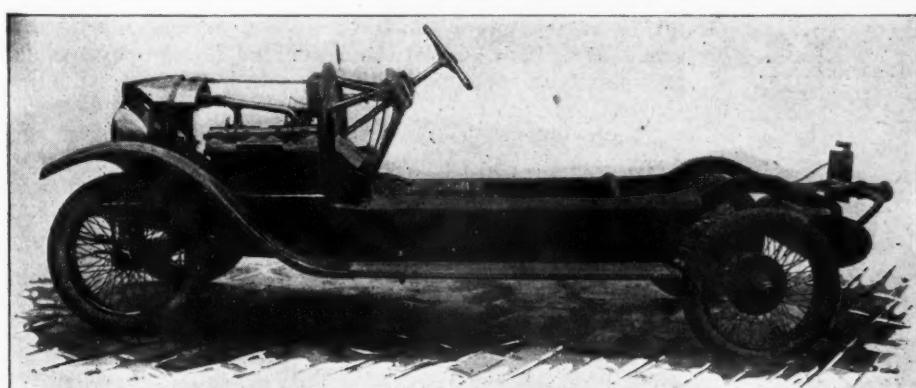
gear. It is claimed that there is absolutely no clashing of gears, and it seems reasonable to suppose that the automatic shifting mechanism works out better with a positive clutch type of change gear than with the sliding pinion type. The shifting mechanism is described as similar in principle to the mechanism of a player piano.

The final drive is by a worm and roller wheel, a type of

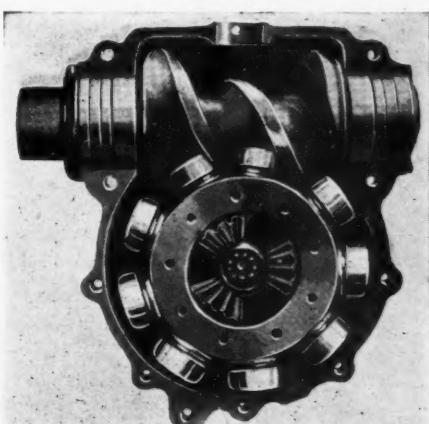


Rear end of Sauer chassis, showing cantilever springs, rear axle structure and rear fuel tank

mechanism which has been used in Germany for a good many years (Pekrungetriebe). This is claimed to operate at a maximum efficiency of 97 per cent. The rear springs are of the cantilever type. Torque and thrust are taken by the propeller shaft tube. There are two stay rods running from a point on the torque tube substantially in line with the center mountings of the rear cantilever springs to the ends of the axle housing, and in addition a third stay rod runs from the same point on the torque tube to the lowest point of the gear housing of the rear axle. The rear axle is of the three-quarter floating type.



Chassis of Sauer leverless car



Worm-roller wheel final drive

New Model of Single Sleeve Valve Engine

The type of valve formerly used by Argylls is revived in improved and simplified form. Removable port liners used in cylinder. Valve is given a combined oscillating and reciprocating motion. Heads are detachable.

PREVIOUS to the war a single sleeve valve engine known as the Burt-MacCullum was manufactured by Argylls, Ltd., of Alexandria, Scotland, and also under license by Picard & Pictet of Geneva, Switzerland. Since the failure of the old Argylls Co. not much has been heard of this engine, but now a post-war design is announced by the Wallace Farm Implements, Ltd., Cardonald, Glasgow, Scotland, the parent licensing company. The engine, of which illustrations are shown herewith, is a four-cylinder of $3\frac{1}{8}$ in. bore and $5\frac{1}{8}$ in. stroke. This gives a rather high stroke bore ratio, viz., 1.625. A high compression

ratio is also used, namely, 4.8. There are three inlet and two exhaust ports in the single sleeve, these ports retaining the same characteristic form as in the pre-war model.

The principal differences between this engine and the pre-war Burt single sleeve valve engine are as follows: A new and simpler design of mechanism is used for driving the sleeves; the cylinder construction is simpler and the heads are now easily detachable. Detachable port liners are fitted in the cylinders. A hot spot induction system is used. Other new features are force feed lubrication to all bearings, three point suspension, lighting generator and starter incorporated in the design, greater accessibility of water pump and magneto, cleaner exterior and reduced weight.

Valve Actuation

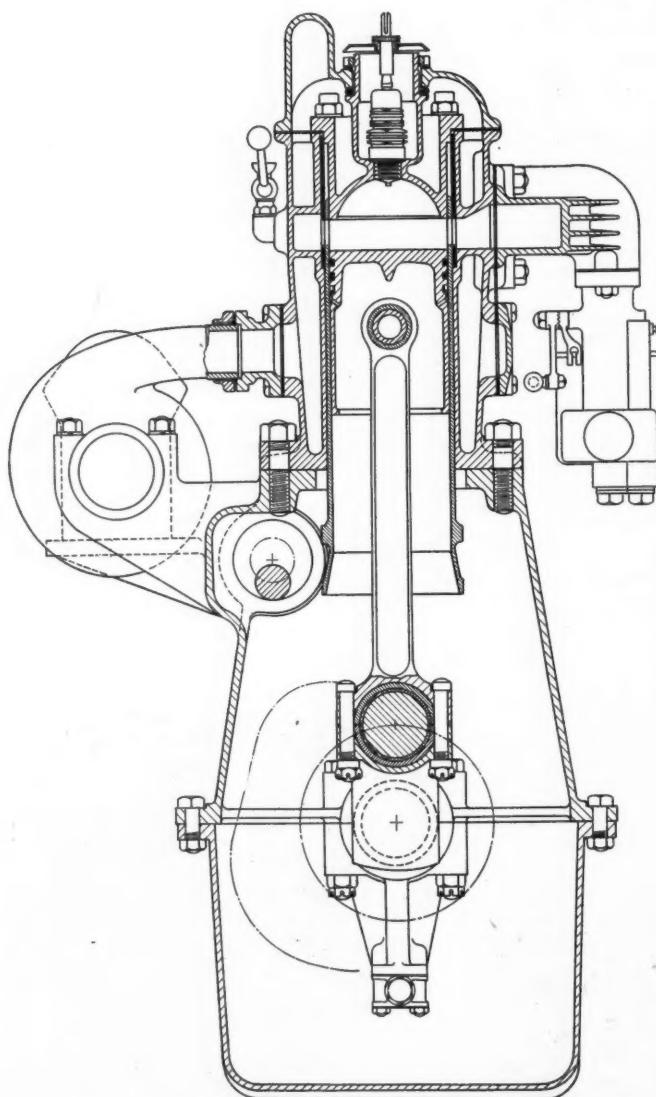
Referring to the sectional view, the valve shaft is driven from the crankshaft by means of a silent chain at half engine speed. This valve shaft is in reality a small thrown crankshaft with a throw approximately opposite each cylinder. Working on each crankpin and lying in a horizontal position is a short link or connecting rod the outer end of which is fitted between two lugs projecting from the bottom end of the sleeve. A fitted bolt passes through these lugs and also through the end of the link which is between the lugs and forms a working joint which allows the link to move only at right angles to the sleeve valve.

It will thus be seen that as the valve shaft revolves and the sleeve link goes up it carries the sleeve with it, and as it goes over the top center it pulls the sleeve round in the cylinder. As the crank goes down again it also carries the sleeve down, and as it goes over the bottom center it takes the sleeve back again to its starting point.

This motion, as will be seen, imparts to the sleeve a combined reciprocating and oscillating motion, and a fixed pencil held against the sleeve will mark thereon an ellipse. It will thus be seen that all ports in the sleeve travel in an elliptical path along the walls of the cylinder, so that corresponding ports in the cylinder are only uncovered by corresponding ports in the sleeve once in a complete revolution of the sleeve shaft or in two revolutions of the crankshaft. The special shape adopted for the ports gives the maximum opening with the minimum travel of the sleeve.

The cylinder is closed at the top end by means of the head, which may be described as a fixed piston, this piston being of the same diameter as the motor piston and projecting into the cylinder, so that between the cylinder wall and the head an annular space is formed in which the top end of the sleeve works. This annular space acts as a seal for the ports during the explosion stroke.

In the pre-war single sleeve valve engines the cylinder ports were cut in the solid cylinder block, but in this engine these ports are simply cored in the cylinder, and a short liner, with the ports cut therein, is pressed into a



Burt-MacCullum engine using single sleeve valve similar to that used on Argylls

recess in the top of the cylinder. This is a very much cheaper operation than cutting the ports in the cylinder block and has been found very successful.

Exhaust and induction systems are cast integral, giving "hot spot" construction. The lubrication system is pressure feed throughout, including the big ends, a very simple type of pump being employed. This pump differs from the usual plunger pump, inasmuch as the long spring is in tension when pump is in operation.

No oil or other connections are made on the bottom portion of the crankcase, which is therefore easily detachable. The oil filter is in an accessible position in the top portion of the casing, and easily withdrawn without the loss of oil.

A RECENT communication from a trade correspondent in England says:

"The 'scooter' having failed to catch on here, certain enterprising interests are trying its chances as a tradesman's parcel carrier, but a machine that has little scope as a passenger carrier would seem to have less as a tradesman's carrier. The objection to the scooter—here, at least—is that its wheels are of such small diameter that it vibrates too much, and rough travel tends to bring about early disintegration of its vitals. For this reason it is to be expected that its career as a tradesman's carrier will be short."



Sleeve valves and actuating mechanism as used on Burt-MacCullum engine

An Adjustable Impulse Coupling

A N impulse coupling for use on truck, tractor, marine and other heavy engines which are difficult to spin by hand, has been developed by the American Bosch Magneto Corp. This device gives the armature a short quick turn when the engine is cranked over.

The impulse member consists of a hardened steel housing fastened directly to the magneto shaft. Inside the housing are two arrester weights which move in and out, guided by tongues on their rear which fit into slots in the housing. The coupling is so arranged that the tongues of the arrester weights engage with the steel block of the arrester plate, which is fastened to the shaft end-plate of the magneto.

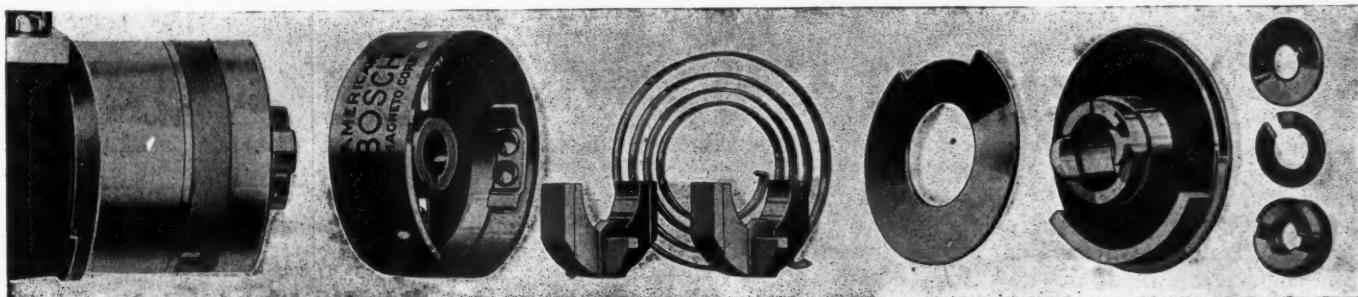
A spring made of highly tempered steel acts as a connecting link between the housing and what might be termed its cover, which is known as the driving flange. One end of the spring is fastened to the outer edge of the housing, the other end is anchored in the hub of the driving flange. The hub of the driving flange carries two cams, which lift the arrester weights at the proper instant, thus releasing the spring.

When the engine is cranked, the impulse coupling is in its normal position, the tongue of one of the arrester weights resting against the arrester block and holding the housing stationary. As the engine is turned further, the driving flange revolves and winds up the spring. At

a fixed point one of the cams on the driving flange lifts the arrester weight clear of the arrester block, and the wound spring is released, giving the magneto armature a quick turn. This causes the magneto to deliver an intense spark in the cylinder then under compression and starts the engine. As soon as the engine attains a speed of 100 to 120 r.p.m., centrifugal force throws the weights in the coupling housing to its outer surface, holding the tongues clear of the arrester block and causing the entire mechanism to act as a flexible coupling.

When this impulse coupling is used to start an engine, it is impossible for the engine to back-fire, because the adjustment is such that when cranking the spark occurs only after the piston has passed top dead center position.

IN Great Britain, where motor vehicles are being taxed on a horsepower basis for the first time, the question has been raised whether electric industrial trucks which may be run over short stretches of public highway from one factory to another or from one department to another, are subject to the tax. The Electric Vehicle Committee of the S. M. M. & T., which took this matter up with the Ministry of Transport, was at first assured that there was no need for a license for such trucks, but later was informed that whether or not a license was required would depend on the circumstances of each case.



Assembly and parts of Bosch impulse coupling

The Handy Man About the Plant Is a Handicap

The jack-of-all-trades may be a useful person when an odd job is to be done at home. His activities in the modern industrial plant, however, not only hinder efficient production, but endanger the safety of fellow-workers. This article tells some interesting incidents to prove the point.

By C. A. Briggs

A "HANDY man around the house" is useful in the home, but in the factory his activities are likely to do more harm than good.

In every factory there are specialists who can take care of emergency needs in a far more efficient manner and with greater permanence and safety, than can the "handy man." But regardless of the presence of tool makers, machinists and carpenters, blacksmiths, plumbers, millwrights and repairmen, who may be called at short notice, the handy man still plies "his trade." Evidences appear in every large plant in the home-made ladders, hammers, screwdrivers, wrenches, punches, patched up machines, etc.

There seems to be no limit at which the inventive nature of the handy man will stop. Some of the most intricate machines must yield themselves to his experimentations. Safety devices seem to be a special prey to the ingenious mind of such a man.

I have seen improvements and adjustments made on circular saw guards that made the saws positively dangerous to operate. Frequently punch press guards are found whose functioning has been interfered with by some operator who was trying out a fancied improvement. The result is usually a situation we used to hear about in politics—"Protection that does not Protect."

Constructive ideas coming from the employee should not be discouraged but should be passed upon by some one competent to judge of their worth. Perhaps a man will spend long hours in studying out an idea that has already been given a trial and abandoned as impractical.

Recently a device was submitted to a safety division for approval that had been worked on for over a year. It was a good idea, basically, yet overlooked one factor that made it of very little value as a safety device. Men do not take into consideration that there are some State industrial laws that say very definitely just how a device shall function and how much protection must be provided for. Even manufacturers of safety devices have sometimes ignored this fact and have had to change their plans.

A "follow up" of the causes of accidents indicates that men are needlessly injured in carrying out experiments that a little forethought and judgment would have shown to be impractical and unsafe.

A few months ago, for example, during an excessively hot period, a man working on a drill concluded that he would construct a fan to bring into the room the same cooling zephyrs that were blowing the tree tops on the distant hill side. He cut out a rude design of a fan from some scrap metal and tacked the blades on a wood pulley wheel. This "fan" he clamped on the swiftly re-

volving shaft of his machine. The safety man saw the "fan" cutting wide circles in the air. Stopping the machine he discovered that the metal blades were imperfectly fastened to the wood wheel and were in immediate danger of breaking loose and flying out over the department, carrying a cutting edge that would rival a razor for sharpness.

Another instance of misdirected energy appeared recently when an electric truck driver rigged up an extension to his foot levers that he might thereby sit more comfortably on the padded cushion he had picked up somewhere in his travels and could thus fill his working hours with ease. Shortly after he had succeeded in equipping his truck with these "fatigue features" he was called away on another job. His understudy was unfamiliar with the new contrivances on the foot levers, became confused as he was approaching an elevator gate and went crashing through. Fortunately, he happened to be on the first floor and the accident did not result seriously, although it nearly ruined the truck with its chair car equipment.

Visiting a garage a short time ago, I was at once attracted by the strong odor of gasoline fumes. I walked over to where a man was cleaning an automobile and found that he had rigged up a combination whereby he was forcing gasoline and water by air pressure through the hose. This allowed the gas fumes to fill the garage with such a density as to make breathing very uncomfortable to say nothing of the still greater hazard from explosion. A knife switch appeared, moreover, on the side wall. Here were all the elements necessary for a catastrophe. The man said it was the best method he knew of for cleaning an automobile.

These things are dangerous; men do not take the time to think a thing through. If a ladder is a few inches short they will not take the time to go for a longer one, but will pick up a couple of boards and nail them to the side rails or stringers of the ladder. This often splits the stringers and makes a very unsafe extension.

Tool handles that are broken are often spliced with wire or nailed, when across the way is a department maintained to do just such jobs as this by replacing. Elevator gates are found with stilts nailed on them so men will not have to stoop down so low in raising them. The "handy men" who do this do not think that this will allow stock or trucks to roll under the land on the elevator should it happen to be down at this time.

The accompanying photograph shows other examples of the handy man's work. In the center is an emery wheel which had been fitted up with a milling machine cutter when the flange to the wheel had been mislaid.

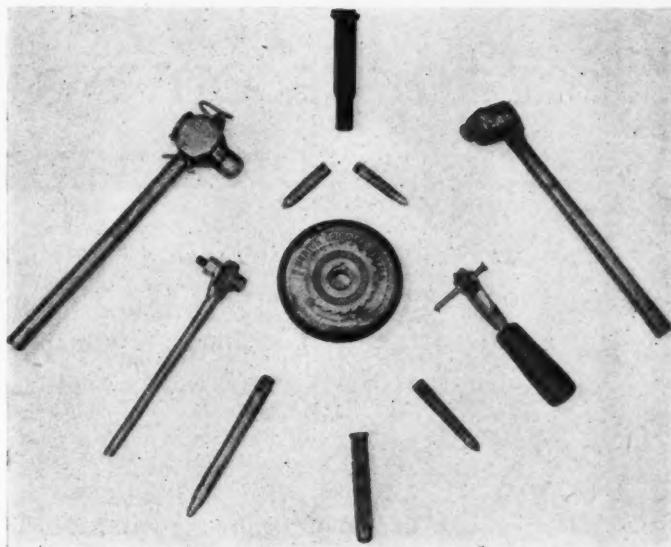
The setting for an injury here could not have been more accurate had the man desired that rather than to save a trip to the stock room for another flange.

On either side of the emery wheel is shown a crude attempt of workmen to make wheeldressers. These two dressers are used for truing up emery wheels which have become grooved or uneven. The tool is held against the rapidly revolving wheel and the steel cutters grind into the stone. A safe type of wheel dresser is furnished at this plant and these attempts were a very unsafe imitation, as will be noted in examining the one with a spike upon which the cutters revolve. Should one of these little toothed wheels break or become loosened from the spindle it would fly with the velocity of a rifle bullet. The wheel dressers adopted as standard by the safety division have a small hood over the wheels which will deflect them downward should they break.

The hammers shown in this photograph were found in the hands of workmen and were not borrowed from the antiques in the city museum. They would be a credit to the man of the Stone Age, but should not be found in a modern factory.

The other small tools, drift pins and punches were made from odd pieces of stock and old files. They were confiscated because they were too hard and flaked off when struck with a hammer. This material is too highly tempered to be used for this purpose. The small pieces that break off fly with great velocity and may imbed themselves deeply into the flesh or eye.

A semi-technical magazine recently carried an article and sketches showing how hand pullers can be made in great variety from old files. The sketches look good and no doubt the tools could be used in the variety of ways



Dangerous tools

indicated by the article. But the writer failed to make clear one important point; namely that the temper must be drawn before using, and by one who knows how.

The handy man who tackles any kind of a job around the plant may be all right in some places, but his useful scope is extremely limited. In the modern plant that employs specialists in all the different lines, the handy man usually intrudes; such work as he attempts should be assigned to the men who have the tools to work with and who can do the job properly.

Development of the Tungsten Industry

TUNGSTEN is one of those metals the uses of which were greatly developed by the war. For about 20 years Germany directed toward Hamburg the greater part of the minerals of this metal and secured control of the products of the minerals and the manufacture and sale of the metal.

Although it was the largest producer of the minerals, the British Empire itself did not escape the German control. After the mineral arrived at Hamburg, it was refined, and then the metal was sold to the manufacturers of high speed tool steel at Sheffield.

Making exception of a small amount of minerals derived from the neighborhood of Limoges, French metallurgists also obtained the minerals necessary for the manufacture of ferro-tungsten from Hamburg, and French steel works procured from the German refiners the tungsten powder necessary for the manufacture of special steels. Not only was France dependent upon Germany for the minerals and the metal, but it also procured from it numerous finished products with a tungsten base, such as magneto magnets, high speed steels, electric lamp filaments, etc.

After the declaration of war, the necessity for an extended production of ammunition impressed upon the Allied Governments the imperious need of procuring abundant supplies of tungsten, in order that the ammunition factories might have all the high speed steel necessary for machining artillery and aviation equipment.

Great Britain, which possesses abundant sources of the mineral in its colonies, requisitioned the mines and developed their production. France, whose resources in tungsten minerals are very slight, found itself in competition on the neutral market with the United States and

with the neutrals working for the Central Empires. The increase in price of the mineral, resulting from this competition, caused a material increase in the production of the mines, and the opening of new deposits which had remained unexplored up to that time. Notwithstanding the efforts of her own metallurgists, France remained tributary to England during the first year of the war, for the supply of the mineral and of high speed steel. The United States made serious efforts, and in 1918 succeeded in obtaining on its own soil the quantities of mineral necessary for the supply of its own war industries with high speed cutting steels. Commissions were appointed between the Allies not only with a view to rendering the blockade of the Central Empires effective, but also to controlling and distributing in an equitable manner the world's production of this mineral.

The consumption of high speed steel in France, which in 1910 amounted to 300 tons, had reached 1000 tons at the beginning of the war, and nearly 9000 tons during the year 1918. In the course of the war, the sales price of high speed steel was subject to wide fluctuations. Its intrinsic value, which even in normal times is quite high, was considerably augmented. The price varied from 60 cents and \$1.00 per pound, according to the tungsten content, all the way up to \$2.00 and \$3.00 per pound.

In the United States the price rose to \$2.50 per pound and this high price prevented exportation. Sheffield Steel Works, on the other hand, delivered the steel in France, carriage and import duty paid, at a price varying from \$1.00 to \$1.50 per pound. French steel works, which had to pay a higher price for raw materials, asked from \$1.60 to \$2.30 per pound for the steel.

Foundry Conveyor Equipment Offers Ideas for Adaptation Elsewhere

The methods of handling castings and other material by means of various types of conveyors add particular interest to the foundry described in this article. The best standards of modern foundry practice are also illustrated by many of its features. A pleasant place to do efficient work.

By Norman G. Shidle

IT is not common to find production equipment in a foundry which offers suggestions for bettering methods in other parts of the factory. Foundry practice and conditions in general are not up to the standards common to other parts of the manufacturing plant. Modern foundries, however, are beginning to embody such improved equipment that a detailed study of their methods is of interest from more than one point of view.

The mechanical conveyor systems used for handling castings and material in the foundry described in this article, for instance, present data of particular interest, since suggestions may be found for adaptation in production processes not connected with foundry work. It is well equipped in other respects, too, and shows the best standards in modern foundry practice. Consequently, this foundry of the Hercules Gas Engine Co., which was erected about a year ago, has features of interest from both viewpoints.

The structure embodies many interesting details of construction and equipment, and has been so built as to facilitate the handling of material and the efficient production of castings.

The foundry is designed to manufacture the castings for farm engines of from $1\frac{1}{2}$ to $12\frac{1}{2}$ hp. While there is little activity at the present moment, this foundry is able to produce all the castings for the 120,000 engines a year which constitute the production schedule of this firm for a normal year.

The storage bins for coke and scrap are adjacent to the railroad, thus necessitating only unloading from the car directly into the bins. Fig. 1 shows how the unloading and handling of material is accomplished.

Material is unloaded from the cars by means of a suspended mechanical belt conveyor. This eliminates the necessity for much handling, and allows the material to be

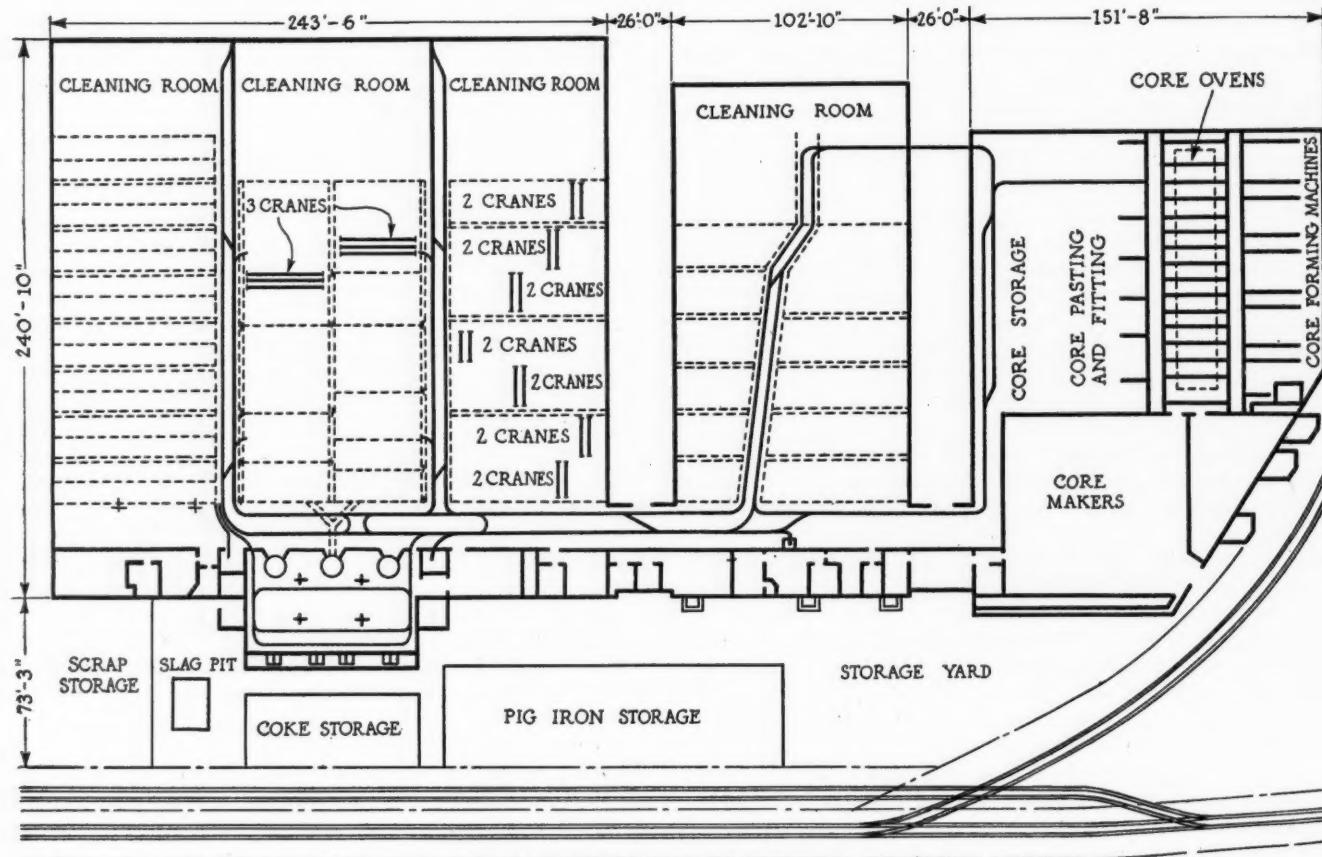


Fig. 5—Ground plan of entire foundry

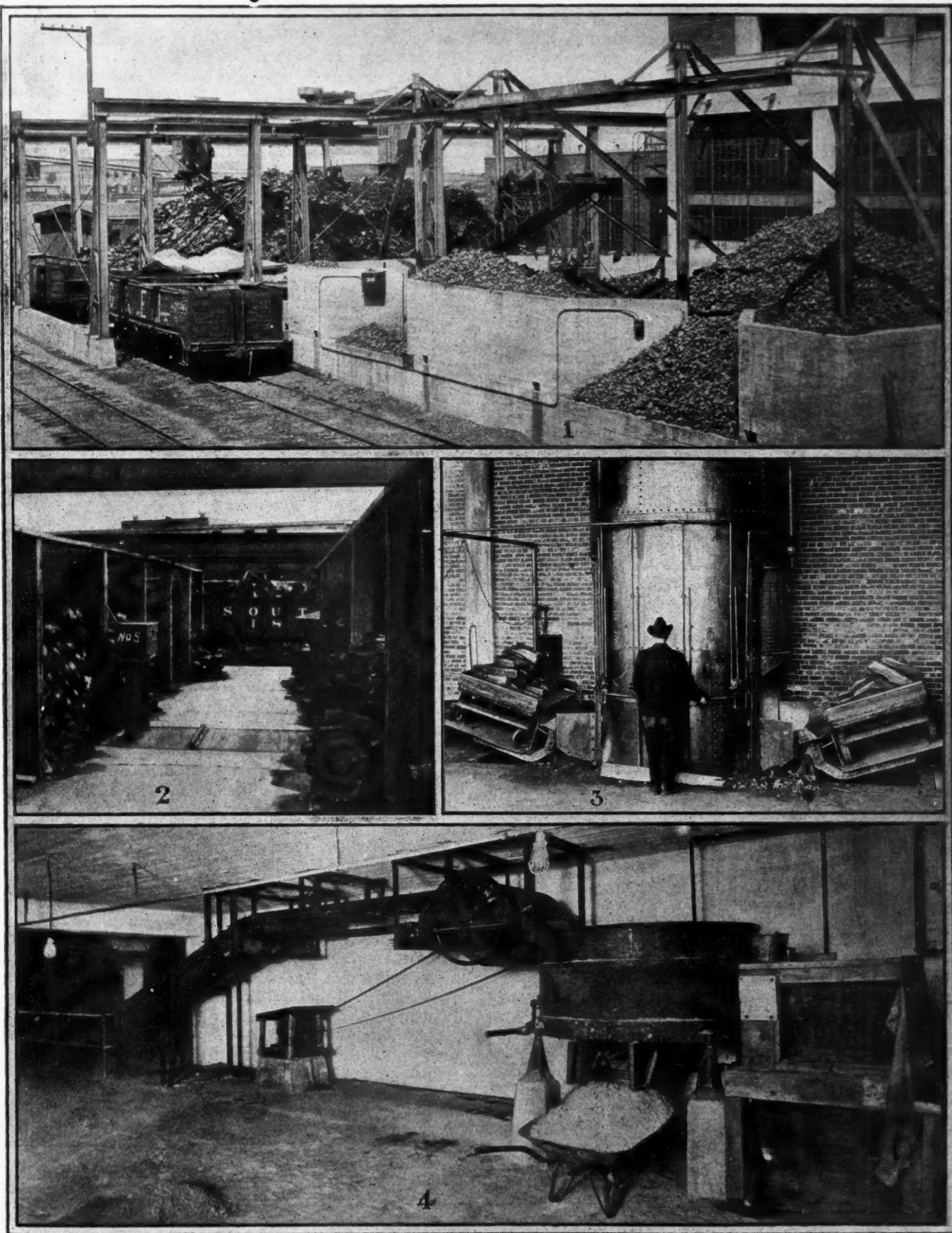


Fig. 1—How material is handled from the cars. Fig. 2—Charges of iron are weighed on these scales, before going to the cupola; no time is lost since scales are provided for each group of bins. Fig. 3—Charging both sides of cupola at once with charging machines. Simultaneous charging from both sides eliminates uneven distribution of coke and iron. Fig. 4—Rotary core sand-mixing machine, ejecting sand into wheelbarrow

transferred rapidly from the car to the storage bins. In the case of sand and coke for the core ovens, the conveyor carries the material to a hopper, from which a belt conveyor automatically carries it to the basement where all such material is stored.

Charging material for the cupolas is carried from the storage bins on electric trucks. Each charge is weighed after being loaded on the truck. Fig. 2 shows the position of the scales in relation to the storage bins. From here the truck is run on to an electric elevator and raised to the charging floor, which is 27 ft. above the foundry floor. The charging floor is of concrete construction, is open on three sides and covered overhead. This open construction gives plenty of fresh, pure air to the men, and is the best possible arrangement for the major part of the year in the climate of southern Indiana. In a more northern location, however, it would not be adaptable, while it is probable that even here a man might have to work very rapidly to keep warm during the more severe part of the winter.

The charges of coke are placed simultaneously in both sides of the cupola, as shown in Fig. 3. The two charging machines are pneumatically operated. These machines tip the cars so that the charge is carried into the cupola by gravity. The trucks for carrying this material have been specially designed, so as to be adaptable to these charging machines. The cars which carry pig iron and scrap are open on one side, while the coke cars are so constructed that one side can be lowered. One of the chief objections to charging machines in the past has been that they tend to give an uneven distribution of iron and coke. By charging from both sides at once this objection is overcome.

There are three 96-in. Whiting cupolas which melt between 250 and 300 tons of iron each day when the foundry is in full production.

The equipment of the blower room, which is located on a mezzanine floor, consists of three motor drive rotary pressure blowers, each of which has a capacity of 52 $\frac{3}{4}$ cu. in. per minute. These blowers are connected with the cupola by a pipe which runs through the floor.

Fig. 5 is a ground plan of the entire foundry and indicates the position of the various departments. The structure is divided into three sections, separated by open bays which provide an excellent supply of light and air throughout. Each bay is devoted in a general way to a particular type of work, the main bay being used for molding the heavier castings, such as flywheels, bases, etc. The cupolas front on this wing.

The second section is used for cylinder molding and for other work requiring a special mixture of iron. The core department is located in the third section.

Features of Core Department

A number of interesting features are embodied in the operation of the core department. From the basement storage the core sand is carried by wheelbarrow to a hopper. From the hopper it is carried by a belt conveyor to a rotary core sand-mixing machine, Fig. 4. Core and sand mixture have been so standardized that workmen need merely to dump the proper number of wheelbarrow loads of sand into the hopper and turn the crank on the oil and water feeders a certain number of times. The sand mixing machine is operated by electric power.

A wheelbarrow catches the sand as it comes from the mixing machine. It is then carried by elevator to the mezzanine floor above the core room. The sand is then discharged into hoppers which lead down into the core room, the core sand for each man falling directly upon his work bench. The core-makers' benches and the discharged sand are shown in Fig. 6. This photograph also shows the arrangement of the molding machines on which the majority of the cores are made.

Adjacent to the core room are the core ovens, seven in number. Similar types of cores are made in certain sections of the core room, adjacent to the various ovens. Thus similar cores are baked in the same oven.

When a group of cores are completed they are placed upon core racks, similar to those shown in Fig. 8. These racks are hung on springs, and operate on trolleys which engage overhead monorails. To connect the tracks running from the core benches to those running through the ovens, a transfer crane is operated on a runway over the aisle between the ovens and the core department. Thus a core rack is filled in the core departments, run into the oven, baked, and removed on the other side of the oven without its contents being disturbed.

After baking, as noted, the cores are removed from the oven on the side opposite the core workers. This allows the cores to cool without spreading obnoxious fumes near the workers, and also makes for efficient movement of the work. Radiation of heat from the ovens is prevented by a lining of Insul brick, and thus another source of discomfort to the workers is removed.

Molding Machines Used

On the main molding floors, the men use portable molding machines. They start work at the connecting aisle, setting down their molds as completed until the far end of the molding floor is reached. The overhead monorail system is used for all heavy work, including the pouring of castings. Fig. 9 shows a part of the main molding floor and illustrates the use of the monorail system in pouring the molds.

The floor plan shows that the cleaning rooms are located in each case at the end of the section. By thus locating them, it has been possible to provide for an elimination of the dirt and dust which accompanies these operations. Each cleaning room is equipped with swing grinders and dust collectors. The collectors carry the dust out into bins, which in turn are carried by an elevated track to the railroad platform.

It will be noted that the work follows a definite and efficient course. Referring again to the ground plan, Fig. 5, it is seen that the melted iron passes from the cupolas to the molding floor and is poured into the castings. The casting later goes straight ahead to the cleaning room at the opposite end of the buildings.

A specially designed machine is used to reclaim sand after it has once been used. This machine is the work of R. G. McSherry, foundry superintendent, and is illustrated in Fig. 7. The sand is left in piles after the molds have been shaken out, and this sand mixing machine, operated by an electric motor, runs along slowly, picking up the sand in the oblong buckets, dumping it into the mixing device, and ejecting it after it has been thoroughly mixed. Exceptionally good results have been obtained from the use of this machine.

The mechanical equipment for the entire foundry was installed under the supervision of Clement A. Hary, engineer in charge of mechanical equipment. It is designed throughout to enable men to work effectively, benefiting both employer and employee. Pond roof trusses with top hung sash are used, and excellent light and air is provided even during periods of full operation. Ample working space minimizes the chances for accident, while the use of the overhead system for pouring off makes for safety as well as efficiency.

Adequate toilet facilities are provided, and the toilets are kept in excellent condition. Shower baths are not only provided but are used, and in many ways the management is attempting to make its handling of the human element consistent with the high standard of material equipment which the foundry presents.

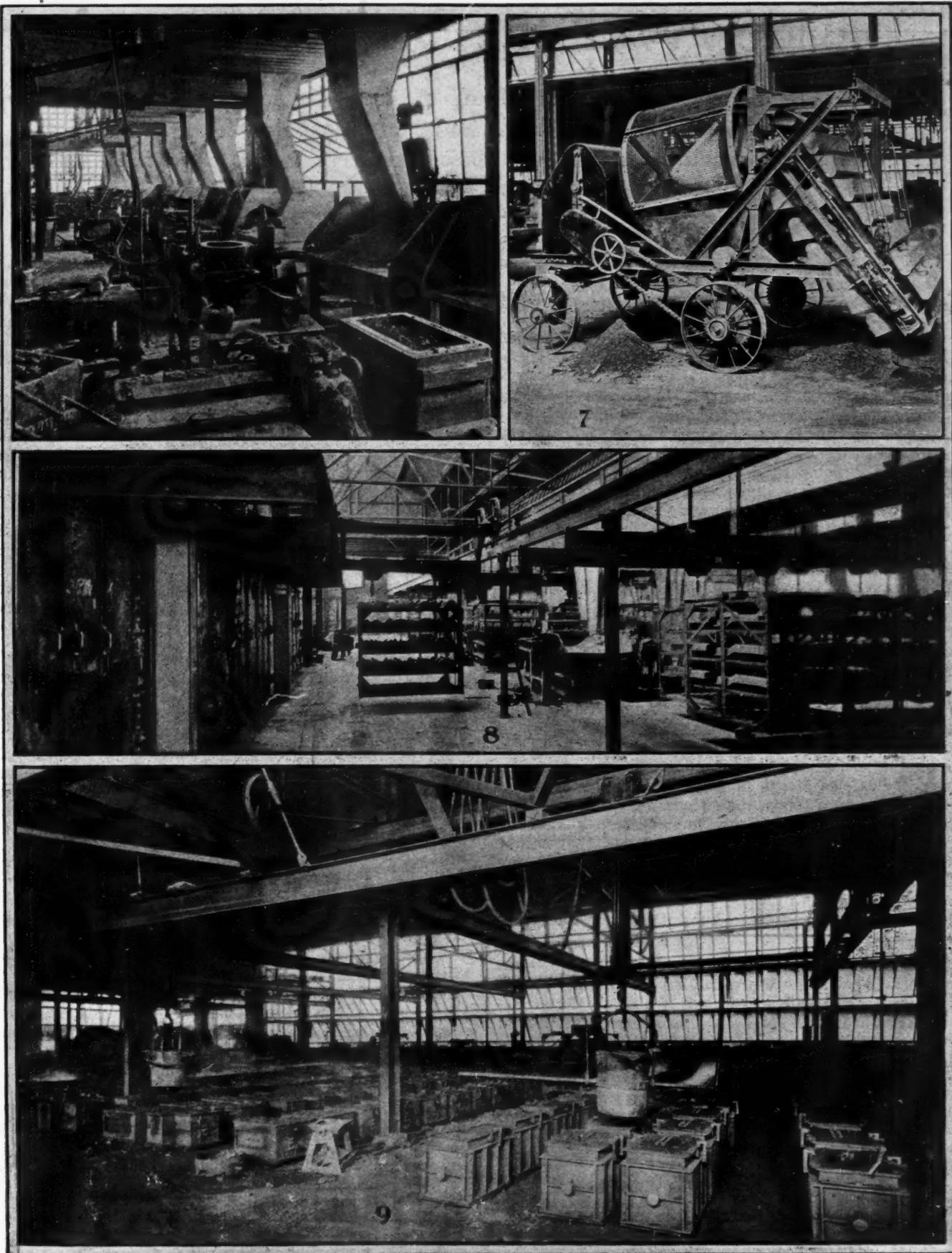


Fig. 6—Core-makers' benches, showing how sand is dumped on each bench by means of overhead distributing system. Fig. 7—Specially designed sand mixer for reclaiming sand once used in molds. Fig. 8—Cores being carried on core rack attached to overhead monorail system. The springs by which the racks are suspended eliminate shocks and jars which might break the cores. Fig. 9—Pouring is handled by means of the overhead monorail system, thus making for both efficiency and safety

Consider Well the Dealers' Meeting

The passing of Christmas always brings the dealers' meeting. This year, the meeting is intensely important. So we offer some unsolicited advice on how to conduct this vital event, based on nerve trying experiences.

By Clyde Jennings

THE season is almost here when the names of the president, vice-president, secretary, treasurer and perhaps, some other factory officials, will be placed on an ornamented program, with the sales manager as toastmaster, as speakers for the dealers' dinner. At least for a meeting of the dealers, if a dinner is not contemplated.

Now in arranging this program, if one can judge the future season by those that are history, no one will have the least concern as to whether any of these officials can speak, or whether they have anything to say. They are officers of the company and are entitled to say their piece; or as it is sometimes put—it is their duty to say a piece. Often this piece was written by the advertising man. If the officials had stuck to that piece, it would not have been so bad—but why continue this unpleasant memory?

As to all of this the writer has just one word to say:
DON'T.

The writer and his editorial associates have probably attended as many dealers' meetings as any similar group of men. In other words, they have been fully bored as often as any equal number of men with the interests of the automotive industry at heart. They have as much at stake in these meetings as any others present—for all who attend usually have staked their hopes of the future on the success of the automotive industry and the selling of vehicles is one of the vital functions. So at least we are interested in the success of these meetings. We hope that we are entirely impartial as to dealers' meetings, as regards this car or truck and that car or truck, but we are not disinterested.

The writer has attended some very excellent dealers' meetings and he has followed the results of these meetings and has been pleased to know that they did bring results.

Also he has followed the results of some other meetings—which were about as interesting as the recitation of an advanced class in a dead language—and has heard the sales manager confess that "Not a damned thing happened after it." In one case the sales manager was mistaken, for he lost several good dealers.

If there ever was a holiday season that should be followed by instructive and helpful dealers' meetings, this is the year. With that in mind, here are a few suggestions that may be constructive.

In the main, the best dealers' meetings the writer has attended have been presided over by a professional toastmaster. There are a few company officials in our industry who are entirely capable of presiding at a meeting—but we have not met many of them. Where a company has such a man, he should be used by all means. If the company has no such a man, by all means hire one.

Next, be very sure what each speaker is going to say

and how he is going to say it. Dress rehearsals are imperative. If an official has nothing to say, keep him off the program. If an official cannot say what he should say in a pleasing and impressive manner, leave him off the program.

There is no more tiresome performance on earth than to hear a company treasurer drivel over the finances of a company in a manner that only bankers could understand. Besides, the dealers have financial troubles of their own. If the treasurer cannot offer to them some suggestions as to the solution of their troubles, why bother them with figures that are larger than any they ever think of in private life? Never forget that you are conducting a dealers' meeting.

We repeat: If there ever was a year when dealers' meetings were important, this is the year. The sellers' market of the last few years is gone. Frankly, for the good of the industry, we hope that it never will return. It produced too many careless features in manufacture. But we must get back to the dealers.

Whatever else you may do, do not growl and scold at your dealers this year. If you do that you are going to lose some of your best ones. Dealers are expecting constructive work this year. They probably have staked their all on the hope of selling your cars next season. They want to know the very best points of the car they are going to sell, why you made the car exactly as you did, some suggestions as to financing, how much credit help you are going to extend, what the production will be and just how it will be distributed, what the advertising plans are, if you will ship promptly the parts they order and dozens of other things of this kind.

They do not want threats, nor do they want to be scolded. They have given to you their best—according to their light and encouragement—in the past and they will continue to do so in the future if you will give to them your best. Any trade of this sort must be mutual. A dealer organization must be co-operative if it is successful. A large share of the co-operation must come from the factory.

The writer heard an advertising manager talk of dealers the other day and he referred to them almost constantly as "the poor boobs." That man's work is doomed to fail. He has not the basic idea of merchandising. He thinks all of the selling knowledge in his organization is wrapped up in his overcoat. **And he never sold a car in his life.**

There was a time when cocktails made a success of dealers' meetings. But that time is past. There can be no artificial inspiration at a dealers' meeting this year. The cocktail as a merchandiser is among those absent now. If you want to give any dealer a drink, do it after the meeting and in private. Do not convict your organization of being a lawbreaker in public.

Perhaps You Are Interested in Foreign Trade

If you happen to be, you will likely find something of interest in these pages. The topics concern motor cars, trucks and tractors and laws, prospects and expositions in all parts of the world.

THE extent of the automotive business in East India is strikingly shown in two recent quotations from the Bureau of Foreign Commerce. The first of these relates to British India and shows that during August 1165 motor cars were imported, of which 916 came from the United States, 139 from Great Britain and 32 from Canada. During the five months ending in August, the imports were 6457 cars valued at \$8,174,880, as against 2066, valued at \$1,881,520, during the corresponding period of 1919. Of the 1920 cars, the United States supplied 4931, Great Britain 755, Canada 542, Italy 42, France 25 and 162 not specified. Bombay imported 2408, Bengal 2226, Madras 844, Karachi 496 and Burma 483. The figures were supplied by Consul Richardson of Karachi.

The second item quotes Consul MacVitty of Saigon, French Indo-China, as saying that territory has the best roads in all of Asia. At present, the Consul states, there are about 5500 miles of excellent roads and an additional 2000 miles are expected to be constructed within the next four years.

"Such conditions present an excellent field for motor cars, motor trucks and motorcycles," he writes. "American makes predominate, although the import duty at present prevailing is high and cars of French manufacture are admitted free of duty. Local opposition to this duty is strong, many urging that it be abolished."

In India

NARANDAS V. DOSSA of Bombay writes, under date of Oct. 22:

"At present the Indian market is flooded with motor cars of all makes of all countries. There is a shortage of gasoline in Bombay and keen competition for selling the stocks of cars on hand, the result being depression; till the present stocks are materially reduced orders will be very scarce. I fear these conditions will last for about six months before any large orders from India can be put into the hands of the manufacturers."

Foreign Expositions

PLANS have been got under way for the celebration in 1922 of the centenary of Brazilian independence, and during July and August of that year an international exhibition and agricultural show will be held in Rio de Janeiro. Arrangements are being made, it is reported from Brazil, for a repetition of the exhibition at Sao Paulo. Although the date is rather far advanced, it should be placed in the "future book" of all American automotive exporters.

An international exposition, one section of which will be devoted to automotive products and aviation, is being planned in Buenos Aires early in 1922. The information reaching the United States is to the effect that a commit-

tee has been appointed to investigate the plan and that this committee now is seeking the support of the Argentine Government and the municipality of Buenos Aires. Five pavilions are to be built, according to the present plans. Three of them will be devoted to products of the Argentine, or other South American countries and of the world, one building being given over for exhibits under each of those categories. The fourth pavilion will be given over to the aviation and automotive industries, while the fifth will house machinery of all kinds.

Numerous exhibitions of interest to automotive exporters and manufacturers will be held throughout the world during the first half of 1921. Among those already scheduled are the following: Ceylon Motor Show, Colombo, opening Jan. 22; Delhi Motor Show, Delhi, India, opening Feb. 7; the Peking Industrial Exhibition, Peking, China, March, 1921; Brussels Commercial Fair, an international showing, April 4-20, and the Lima Centenary Celebration, which will include an international trade exhibition, Lima, Peru, June-October. A recent report from Lima stated that American Government representatives had taken options on 10,000 sq. ft. of space in the exhibit halls.

Witwatersrand Agricultural Show, including automotive and machinery sections, South Africa, March 23-28, 1921; Algiers Agricultural Show, date not fixed (apply to M. Celestin Granier, Commissaire General, 4 Rue Marechal Bosquet, Algiers), and the East Indian Fair, Sept. 19-Oct. 9 (apply to Fair Authorities, Menadostraat, Bandoeng, Java, Netherlands East Indies).

Southern South America

THE increasing use of the automobile in the southernmost parts of South America is revealed in a recent letter from Punta Arenas, Chile, on the Straits of Magellan. This city, which is the capital of the territory of Magallanes, is about 1450 miles south of Valparaiso, Chile, and almost as far from Buenos Aires. The territory is little developed, its chief products being sheep, fur, skins, wool, whale products and coal. The temperature there averages some 43 deg. Fahr. and almost half of the days are usually rainy.

Nevertheless, the estimate was made that there are "over 1000 automobiles in Magallanes and Patagonia. The roads are very poor, the distances are very long, but the automobile is almost the only means of transportation."

In Tientsin

AN estimate of the motor population of the Tientsin, China, consular district places the number of cars at 1500 to 2000, motor trucks at 60 and motorcycles at 75. These figures were supplied to the Bureau of Foreign and Domestic Commerce by the American consul general at Tientsin.



An American's View of the Olympia Show

Editor AUTOMOTIVE INDUSTRIES:

One cannot help being impressed with the immensity of the exhibition staged by the S. M. M. T. It was certainly the most truly international motor show ever staged in any country, and in floor space and in number of beautifully finished chassis and cars our own annual shows look rather commonplace.

But on analyzing the types of car shown and the price tags, one asks, Where do they expect to sell the products? for most of the English and Continental cars are restricted by design to use in countries or sections with good roads. The United States is certainly a very limited market, principally on account of price. While there is a small field for the imported car de luxe in the United States, a discriminating buyer will find several of our own high class cars much better value for the money.

A general survey of the show makes one feel that many of the designers imagine they are still working for the Government on war work, and elaborate design and indifference to cost of materials and production are frequently quite apparent. In the case of the high priced de luxe cars, such elaborateness of design is justified, as the makers are catering to a class who want a beautiful piece of mechanism, and are willing to pay the price. But many designers in attempting to produce smaller cars for mass production have simply made miniature copies of the larger cars and do not seem to realize that lower selling price means a different treatment in design. In this price class, one sees very elaborate aluminum castings embodying engine bonnet rear support (or "dashboard"), toe-boards and extended instrument board, to which the steering post is supported. This construction makes a nice looking job, and its cost and weight are justified in cases where custom made bodies are fitted, but in cars where the chassis factory mounts the body, experience has shown that a sturdier construction, with less weight, cost, and tendency to rattle, is obtained with all of this mounting integral with the body cowl.

The foreign designer also increased the cost in blindly following his ideals of thoroughness by using alloy steels in many places where necessary requirements of rigidity or adequate bearing surfaces and fits automatically demand such largeness of size that good carbon steel is never stressed anywhere near its elastic limit, and fatigue is a very remote possibility. Much wasted material and slower production were caused during the war by designers ignoring this practical fact.

The English small car—and by this term I mean the 10-12 hp. car in production by so many manufacturers, and not the cycle car or two-seater—has a longer wheelbase than the American car of the same passenger capacity. Some of this greater length of wheelbase seems wasted, as they frequently locate their pedals very far back of the rear cylinders, and this condition is what determines the position of the front seat. There is no question, however, that the English and Continental car bodies have lower

seats than the American cars, which arrangement, of course, requires more leg room. The good roads abroad make possible this lower seating, but body builders in the States find that many people object to the greater effort required in rising from a low seat. The American manufacturer, for quantity production, has to adopt a compromise which will find favor with the greatest number of people, and makes his seats from an inch to two inches higher and a little straighter back than the foreign body designer. This compromise results in decreased wheelbase, which in turn results in less weight and lower cost of the complete car. We have only to compare the Franklin six-cylinder car of 115 in. wheelbase with the Austin four-cylinder "twenty" of 129 in. wheelbase, both seating five passengers, to feel convinced that it is possible by skillful design and distribution of car elements to save several inches of wheelbase, and still obtain very satisfactory seating comfort. The Austin twenty is cited as it is a typical British car, and one of the few and notably successful attempts at designing a five-seater which would satisfy the English and Colonial users in the largest numbers, competing with American cars of similar characteristics, and create a market which would enable it to be put in quantity production so as to get the selling price down to what is a medium price this year—£695—including body and everything now considered as standard equipment on an American car. One has but to compare this car and its price with two American cars of about the same size engine and seating capacity—the Hupmobile selling at £750 and the Dodge at £610—to realize that in this field the English have a competitive car for the English market, which is protected at present by an import duty of 33 1-3 per cent on cost plus freight, and by the rate of exchange.

Two outstanding impressions received by an observer are:

First.—The presentation of so many de luxe cars, some of these entirely new designs, others refinements and elaborations of previous models.

Second.—The struggle by the British manufacturers to get out new models in which low first cost and economy of operation, especially as regards gasoline consumption, have been the object in mind.

In regard to the first item, as the chassis price of £2,000 or more would indicate, in designing and preparing the car for the market no serious regard has been paid to cost of production, as long as the designer's object has been obtained. The Rolls-Royce, pioneer in this class, looks rather crude and trappy compared to some of its more recently designed and cleaner cut competitors. Some typical features of design in this class are as follows:

Aluminum cylinders with steel liners, and other characteristics of airplane engines.

Overhead cam shafts. (The eight cylinder Leyland designers evidently realize the difficulty of getting quiet operation with overhead cam shafts and drive same with a unique system of triple eccentrics on both cam shaft and lower driving shaft connected by long coupling rods.)

Four wheel braking systems, some operated pneumatically.

Anti-rolling or torsional equalizers, supposed to check the roll or sway of the body.

Cantilever springs with ends supported on roller slides. Wheelbases from 144 to 150 in.

In respect to the second outstanding impression, there appears a sort of standardized belief in the minds of numerous foreign manufacturers that from ten to twelve horsepower is the right size engine to get the maximum of performance with minimum expenditure of fuel to transport four people (in some cases five), and there has been more effort expended by designers and manufacturers to present cars in this class than any other. The engines in these cars have only about one-half the piston displacement of a Ford engine, a wheelbase about the same as a Ford car, a track averaging about 48 inches, tires about 28 x 3½ in., and a weight only slightly less than the Ford car, but the cost is considerably more, ranging from £450 to £600. These cars are supposed to average about 40 miles to the gallon and even a great deal more on special tests. Aside from good, modern, clean cut design and practice, and good workmanship, there is nothing radically new or novel about these small cars to account for any better economy of operation than American cars in proportion to size. It is simply a case of small engines in light weight cars on good roads. One must also realize that the English gallon is one-fifth larger than the U. S. gallon. Higher gear ratios in the rear axles are generally used and are practicable on account of the good roads. This fact helps in keeping down gas consumption. Some justification for the seemingly high price for such a small car is seen when one considers that the body, although seldom holding more than four people, is better made and finished throughout than that of the small American car, all metal fittings, including windshield uprights and framing, being nickel plated. Leather upholstery is the rule, and the painting is generally done in colors.

Some of the miscellaneous impressions received during inspection of cars on exhibition are as follows:

The disk wheel is used on a great number of cars of all classes and, in the judgment of the writer, will be used very largely in the future in this country.

Even on the expensive closed cars, straps are mostly used for raising the windows, and very few mechanical window lifts are employed. The explanation given was that the latter are not reliable enough.

The electric wiring is generally first class, both as regards planning and workmanship.

There is an increasing number of makers using sleeve valve engines.

For use with removable cylinder heads there has been developed a method of sealing the water passages between cylinder block and head by rubber gaskets, so that the copper-asbestos gasket has nothing to do but hold compression.

There were several instances of battery ignition installed on new models by English and European manufacturers, so that it is quite evident that the decided prejudice in the minds of foreign manufacturers against the use of anything but magneto ignition has begun to disappear.

J. G. PERRIN.

Front Wheel Drives

Editor AUTOMOTIVE INDUSTRIES:

In your issue of Oct. 7 we noticed an article on the use of the front wheel drive on automobiles, in which you recommend its use in connection with double deck motor buses.

As you know, the Latil line, which we manufacture, consists of four wheel drive tractors and front wheel drive trucks.

In addition to the special use that you mention, there are others which are particularly interesting for this type of vehicle, among which we may mention motor trucks for the transport of racing horses, garbage trucks for municipal work, delivery trucks for department stores, and moving vans.

The difficulty, as you have so well explained, consists in finding the right way to build wheels that are at the same time used for steering and driving. Our Latil system of front wheel steering and driving has been in use for the past ten years.

CHAS. BLUM & CIE.

Wheel Wobble and Tire Wear

Editor AUTOMOTIVE INDUSTRIES:

"The Forum" for Nov. 4 takes up the matter of tire wear as related to wheel wobble and faulty wheel alignment. It seems to the writer that the relation of wobbling wheels to tread wear is a generally accepted error which the trade press seems anxious to perpetuate.

I should like to lay down the proposition that the only thing which can cause side slip of the tire on the ground, and, consequently, tread wear, is an angle between the true axes of rotation of the two wheels on the same axle. This applies to front and rear wheels alike so long as the vehicle is moving straight ahead, and disregarding the slight correction for camber.

Inasmuch as the true axis of rotation cannot be changed except by change in position of the bearings in which or on which the axle shaft or wheel turns, it is apparent that rear wheels cannot be made to side slip except by distortion of the axle housing. The bending of a semi-floating rear axle shaft or distortion of wheel rim or tire does not affect the alignment of the bearings and, consequently, cannot produce side slip.

Observation of a rolling cookie cutter will give visible proof that even a greatly exaggerated wobble does not cause slippage.

W. B. JONES.

Book Review

THE GASOLINE AUTOMOBILE, its design and construction, Vol. II, by P. M. Heldt. This is the fourth edition of Vol. II of Mr. Heldt's series covering the design and construction of automobiles. Vol. II deals with the transmission, running gear and control, and includes the theoretical and empirical considerations of design for practically all of the chassis but the engine. Those who are familiar with the second and third editions of this work will find in the present edition about thirty pages of tabular and other matter which has been added to the appendix for reference work, and in addition, the text has been thoroughly revised and brought up to date.

The work is noteworthy for its thoroughness and covers every phase of chassis layout necessary for the design and installation of the clutch, transmission gearset, propulsive unit, axles, brakes, control and suspension.—J. Edward Schipper.

THE Federal Power Commission in a recent statement says: "The urgent need for enactment of adequate legislation respecting the use of water power on the public lands and the navigable rivers of the United States, which was met by the passage of the Federal Water Power Act during the past session of the present Congress, is shown by the extent to which advantage has been taken of its provisions. One hundred and thirteen applications for a permit or license for power development have been filed with the Commission."

Methods of Making Wage Adjustments Need Careful Study

When the cost of living has definitely decreased wage reductions are bound to come. Trouble will ensue if manufacturers take advantage of the situation and reduce them arbitrarily and without discussion. The cost per piece of labor is more important than wage rate levels.

By Harry Tipper

THE question of wages, wage rates and the methods to be adopted in adjusting these wages to the new market conditions is a very pertinent one for many manufacturers at the present time, and the discussions of it are very interesting in their variation of analysis and the examination of the factors which they consider. In this connection Don F. Kennedy has written an article in the *Iron Age* a portion of which, worth quoting for its suggestion in connection with the matter, follows:

There are those who are heard to say that the workman was blind who could not see ahead what was coming, and lay up a savings account to tide over such periods. They assume to give the workman more intelligence than many a corporation which invested its high profits of the past few years in factory extensions and new machinery to pyramid these profits, and which now finds itself possessed of an enormous plant and corresponding overhead charges, but with no working capital with which to finance it. A certain man whom many of us know by hearsay, but fewer by actual acquaintance, one Adam Smith, pointed out 150 years ago a fundamental truth that is overlooked in such discussions; that a workman by the very nature of things is a man without the means to support himself over any lengthy period. When the more intelligent or more diligent workman has succeeded after some years of toil in laying up a sum of money he sets up in a small business of his own with his accumulated wealth, and behold! he is no longer a workman, but an employer, even though he may employ at first only one or two men.

But in figuring whether or when wages should be decreased, several items require consideration.

The head of a large automobile company said recently that he had taken some pains to find out the results of the requests of his purchasing department to its sources of supply for reduced prices to compensate for the reduction in the price of his car forced on him by the refusal of the public to buy at the old figures. He said that one of two answers was invariably given. Either the reduction was granted, or the plea was made that materials remained as high as ever, wages remained the same, and consequently no concession could possibly be made. Never was a word said about a reduction of profits! This alternative never seemed to have entered their minds. This man said that they themselves had taken a large cut out of the profit part of the selling price of the car when reduced prices were decided on.

Two women in a mid-western city this fall had occasion to have their fur coats repaired and remodelled. The

coats were nearly identical, and the work required was about the same. One took hers to the leading fur store of the city and left it there. The other hunted up a smaller shop on one of the less important streets some little distance out. Her coat was done first, and it so happened that they both went together when the coat was ready. While in this shop the first woman saw a coat hanging up which looked so much like her own that she examined it closely, and to her surprise found that it was her own that had been sent to this place to have the actual work done. Comparing prices, she found that she was paying the large store, which was filling the newspapers full of advertisements of furs and work at enormous reductions, a clear profit of \$400 for handling the transaction! A large department store in this same city last week experienced the poorest day's business in the history of the institution. The manager was severely taking to task the saleswomen for not selling more goods. He said that prices had been reduced on everything, and that the girls should make more sales. The head saleswoman of one department replied, "The people will not buy, and we cannot make them. After the exorbitant profits you have been making in this department for the past three years you should be content to operate at cost or a little less for a time."

In deciding where reduced cost of operation should begin, profits ought to be the first item scanned. In considering the item of wages, it should be kept in mind that the chief components of the cost of existence of the ordinary person are still nearly at the top. Retail prices of the daily necessities have not yet been forced much below their highest levels. Taking advantage of the country-wide shortage of houses, rents have been criminally increased. Jumps of \$10 and \$20 and \$40 a month have been made time and time again—with no alternative but to pay. Rents have not been reduced. The householder who listened to the advice of his Chamber of Commerce and others to whom he would naturally listen for counsel filled his cellar with coal for the winter, and now finds that he paid peak prices. This important part of his budget is settled for him for this year. Retail prices of food have dropped less than 3 per cent. Much noise is being made in the public prints of reductions of a cent or two in bread, but this means but 10 or 15 cents a week to the average family. Clothing has dropped greatly, but in times like these workmen out of a job or working part time are not buying new clothes.

In brief, the cost of existence of the laboring man is still at its highest point to all practical purposes. When retail living costs, of which the major items are rent, food, heat, light and clothing, come down,

then it will be in order to reduce wages accordingly. When such action does become necessary, go to the workman frankly and honestly, and he will receive you in the same spirit.

It will be noted that Mr. Kennedy has referred to the fact that the increase in wages to the worker did not occur automatically as the cost of living rose, but occurred only under the stress of labor shortage, sometimes many months after the disturbance in the buying power of the workers' income had begun. In some cases the increase in wages did not catch up with the increase in living expense at any time. This was the case with some of the classes of workers in the mines, on the railroads and in some of the general distributing lines of business. These things are fairly well known and the worker is not sufficiently blind or unintelligent to be completely ignorant of them.

Mr. Kennedy, however, has left out one of the most important factors in connection with the matter and that is the increase of the individual efficiency of the worker in many lines of industry. Reports from industrial centers continually refer to the fact that with a 25 per cent cut or something of that kind, the production has not been materially decreased. This, of course, means that the labor cost per unit has gone down to that extent and the wage rate is not indicative of the labor cost.

The worker is expecting some reduction in his wages. He knows from past experience that a slackening of industrial effort and consequent unemployment means a reduction in his earnings. He is not going to be very much disturbed by a reasonable reduction which is justified to him by the frank and open method of its adoption.

He is thoroughly aware, however, of the fact that many industries increase their profits at a much more rapid pace than his wages increased, he knows that his wages did not increase as fast as the cost of living increased, and he knows that the cost of living has not decreased to him as rapidly as the price of the manufacturer's product has changed.

The arbitrary attempt which is being made by a number of factories to reduce the wages of their employees without regard to the variation in the cost and the relation of that reduction to the cost, will serve to confirm the opinion existing upon all sides that the present wage systems are not determined upon any basis of co-operation or values, but only upon the advantage or disadvantage of the manufacturer in the labor market.

We have almost succeeded in exploding the commodity theory of labor, and we have begun to study the efficiency of labor as a human matter and a matter of human interest, conduct and behavior. We shall not get very far in this period if we proceed to take full advantage of the reversal in the situation, and arbitrarily reduce the wages of the workers without explanation or discussion and without any relation to the cost or the profits. Even if we feel that we are fighting labor, we should fight clean, with open weapons, and some decent rules of conflict.

These call for a reasonable study of the variation in the cost of labor per unit of our production, brought about by the increased efficiency of the labor itself. We must examine the effect which such a reduction would have upon the buying power of the worker in relation to his costs of living, not to the prices which are presently being secured by the manufacturers. We should study the matter from the standpoint of the workers' expectations and reactions so that our conclusions may be fair and seasonable.

In any case, the important matter is not the general change in the level of wage rates, it is the cost per piece of the labor expended upon that work. It might be well to consider how much of the full efficiency of labor we are securing, how much can be secured further by proper methods of organization and how much these improvements would be retarded by changes in wage levels, and whether a reduction in the wage rate will result in a reduced cost per piece or not.

We are still inclined to look at the rate of wages as the governing element in the cost of labor per piece when, as a matter of experience, the relation between rate and the cost is not by any means exact.

Reductions are bound to come. The consideration of these reductions can be conducted in such a way as to indicate a spirit of fairness which will go far to solve the present problem and lay the basis for the solution of future problems of a like character.

It is possible to approach the reduction in a way which will discourage suspicion and indicate a fair degree of justice in the method of tackling the problem. What we finally desire is a reduction in the unit cost per operation per piece, and any changes in the wage schedule should be so determined that they will have that effect and not merely reduce the wage scale.

The American Tractor in Italy

AN interesting note on the use of American tractors in Italy is found in a recent report Alfred P. Dennis, Commercial Attaché of the American Consulate in Rome. His comment follows:

"One hears no word of criticism of American tractors in action; they give satisfaction when properly handled. Unfortunately, the American machines have been very badly handled since the outbreak of the war. The Italian Government purchased 6,500 American farm tractors during the war and put them to work in various parts of the country. It was thought that these machines could to some extent take the place of the thousands of farm laborers called to the colors. The Government-owned tractors were operated by soldiers. They would go from village to village, field to field, plowing the soil where their services were needed. Many of these men had no

skill or experience as mechanics. As a consequence, the machines were not properly handled.

"With the return of peace conditions the Government began to sell farm tractors to the farmer under a liberal credit arrangement. All but 2,000 of the original 6,500 have now been disposed of and are being operated by individual owners. The Government has set up at Campagnelle shops for the repair of tractors, but the work is proceeding slowly. Some of the machines are in such bad condition that they are virtually being scrapped to provide substitute parts for the units that are being overhauled.

"The point should be emphasized that no American tractor can hold its own in the Italian market without a local service station equipped for instructing operators and for supplying spare parts for repairs."

AUTOMOTIVE INDUSTRIES

AUTOMOBILE

Reg. U. S. Pat. Off.

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Horace M. Swetland, President
W. I. Ralph, Vice-President
A. B. Swetland, General Manager

U. P. C. Building, 239 West 39th Street, New York City

BUSINESS DEPARTMENT
Harry Tipper, Manager

EDITORIAL

David Beecroft, Directing Editor
Ray W. Sherman, Executive Editor
Clyde Jennings, Managing Editor
P. M. Heldt, Engineering Editor
Herbert Chase Norman G. Shidle

DETROIT OFFICE
J. Edward SchipperWASHINGTON OFFICE
816 Fifteenth St., N. W.

BRANCH OFFICES

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Greetings!

AT this season of good fellowship, the staff of AUTOMOTIVE INDUSTRIES wishes to be included among those who extend to you all the greetings of the season and the best hopes for next year. We wish that it were possible for each of us to have personal contact with all of our readers, that we might profit thereby and better understand each other.

This is not a mere formal thought prompted by the sentiment of the season. We honestly believe that the readers of our paper are men of such caliber that one cannot come into intimate contact with them without carrying away some betterment for himself.

The year that is drawing to a close has been one of surprises. It did not carry to its end the rosy prospect that all of us saw at the beginning. Few of us were true enough prophets to foresee, at the Christmas season a year ago, exactly what the coming year would bring forth. There are some who believe that the dark days of the year 1920 were needed—that they will in the end produce a wholesome effect upon the industry. If lessons were merited in the last year, we hope their teaching will not soon be forgotten.

There was a period during this year when many in the automotive field felt that our industry was the "goat" of the credit system. To any person who still holds that there was unjust discrimination we suggest a few hours' reading of papers devoted to other industrial activities. This will convince the most skeptical that the sackcloth and ashes have been well distributed and perhaps remove any bitterness that remains in the memory.

We believe that the sky is clearing, that better days are dawning and that with the New Year will come more to encourage than was believed possible a few weeks ago. With this in mind let us take advantage of this season of humanity, forget the trifling wrongs of the past and go forward, each feeling a bit closer to his fellow man and resolved to place his standard of business for 1921 on a higher plane. Humanity and justice should be woven closely into the fabric of a successful industry.

May you carry with you throughout the new year the Christmas spirit! Then we know that you will be happy and prosperous.

The Winter Top Increasingly Popular

THE winter top seems certain to see wider popularity and consequently more frequent use as its advantages become more generally appreciated. It will not, of course, displace the closed type of body, yet it possesses most of the same advantages and has besides peculiar advantages of its own. The weight of the top plus that of the touring car or runabout body is much less than that of the corresponding closed body, and the same is true of the cost. Furthermore, the winter top can be and usually is so constructed as to be easily converted into an open type, which many prefer for use in warm weather.

Until recently, however, the winter top has been more or less of a makeshift or has not been given the care in design and finish it required to become really popular.

The winter top can and should be made smart in appearance and in keeping with body lines, not a makeshift simply set on the body as a protection from the weather without regard to looks. When intelligently made, it greatly increases the utility of the car and consequently becomes a genuine sales asset.

The closed body car is beyond the reach of many buyers who would unquestionably pay the slight additional cost of a well designed and well made winter top over that of the top commonly furnished, especially if the car manufacturer will see that details of interior trim, finish and appointments are in keeping with what the car becomes when so equipped—a modified closed car suitable for use as an open type.

Trimmings and even seat arrangement may well vary from those of the touring car, resembling so far as practicable those of a sedan body while still suitable for use when the body is opened.

Such a car, fitted if possible with a heater, becomes a year-round family car which should find a ready market among discriminating purchasers.

Better Body Construction Needed

THE article by our British correspondent, which appears on another page, severely criticises the bodywork on American cars and is worthy of careful consideration by our car manufacturers regardless of whether they sell in the British market. After making due allowance for the natural difference in viewpoint as between the American and British uses, there is ground for the criticism made, as is evidenced by the data submitted. Similar criticism has frequently been voiced by discriminating buyers in this country. Faults of the character indicated may be tolerated by impatient buyers when demand exceeds supply, but they reflect no credit upon the manufacturer and certainly detract from the salability of the car and the satisfaction of the user. Consequently, they should be remedied, especially at this time, when business is dull and the wise builder is losing no opportunity to improve his product. Those who are competing in European markets, in particular, cannot afford to overlook or fail to heed such obviously constructive criticism.

It has long been said that the passenger sits on rather than in the American car. Improvement in this particular, as well as in the proper sloping of cushions, has been made in some domestic cars and might well be made in all.

It is a well recognized fact that attractive body lines and appointments are a sales asset not to be overlooked. Opinion as to what constitutes good body lines is bound to differ with varying tastes, but there is no excuse for carelessness in finish and fitting, or for failure to provide for the comfort of both driver and passenger. There is, for example, no real occasion for badly fitted doors and hoods, for unfinished hardware, carelessly attached, or for windshields not in keeping as to design and finish with the body or other appointments. We are accustomed to work to thousandths of an inch in mechanical parts, yet in a body operation such as fitting a door, a gap of over a quarter inch is expected to pass inspection! However well built, our chassis do not, in the average case, compare favorably in appearance with the European chassis, and this is even more true of the body and its fittings. Here there is much room for improvement.

Our correspondent says the British purchaser would prefer to pay ten per cent more for his car than have to apologize for its appearance. The same is true, we think, of discriminating purchasers in this country, but we believe the desired result can be accomplished with but little if any increase in cost. A little more intelligent forethought in design combined with the same care in production, finish and inspection that are given mechanical parts in well run plants to-day, and the ground for criticism will disappear.

We suspect that the basic cause for faulty design, construction and finish of bodies to-day is the lack of thoroughgoing engineering work and the survival of obsolete methods (or in the lack of method) in the body department. Supply the equivalent highly trained organization to produce bodies that now produce chassis and the result will be identical.

In some cases where the cost of the chassis is pretty well fixed, the temptation—and, we fear, the practice—is to cut the cost of the body in order to sell at a certain fixed price. This is a serious mistake and one bound to react on the manufacturer.

There are six steps in the production of a satisfactory body:

First, a design which is pleasing to the eye and incorporates the features and dimensions essential to comfort. Second, the construction and service test of samples, using various finishing materials if possible. Third, the selection of materials and fittings consistent with the results of the tests employed, and of the best possible quality within the allowable price range. Fourth, the adaptation of the design to quantity production, without changing its characteristic appearance unless absolutely necessary for economy and then only in collaboration with the designer. Fifth, the manufacture of the component parts and their careful assembly into the body. Sixth, the assembly of the body on the chassis and the final finishing.

The fifth and sixth steps must, if the desired result is to be obtained, be carried out under rigid inspection to see that details of finish and fit are held to proper specifications and tolerances.

Each step must be correlated with the others, and, of course, the steps will overlap to some extent, but the omission of any step or its indifferent execution will lead toward the unsatisfactory state of affairs that has given rise to the criticism cited.

N.A.C.C. Concentrates on Show Plans

Invitations Sent to 30,000 Dealers

Utility Advertising Campaign Ready to Start—No Space for Foreign Cars

NEW YORK, Dec. 21.—The machinery of the National Automobile Chamber of Commerce which will operate the annual New York show beginning Jan. 8 is running smoothly. The chief complaint is lack of space to take care of would-be exhibitors. While Sam Miles, the show manager, is not given to predictions, he admits there is every reason to believe the exposition this year will be the most successful as well as the most important ever held.

Invitations have been sent to 30,000 automobile dealers in every part of the country, and while it is not expected all of them will be at the show, those who do not attend will make themselves conspicuous. Manufacturing companies are making unusual efforts to get their dealers to the exhibit and will look after their comfort while they are here. All the larger companies will have dinners for their sales forces at which efforts will be made to inspire them with the realization that the business tide is turning.

Preparations have been completed by the National Automobile Chamber of Commerce for the launching of the extensive campaign which it will conduct in New York and Chicago simultaneously with the shows to prove that motor vehicles are an essential part of the transportation system of the United States. The dealers themselves are enthusiastic over the possibilities of this means of convincing bankers and business men that the motor car is not a luxury to be classed with face powder and perfume.

Cities Pool Advertising Funds

The dealers' association in Chicago has made an appropriation of \$10,000 which will be added to the N. A. C. C. fund for that city. The Newark, N. J., dealers also have pooled their funds with the N. A. C. C. The New York dealers will carry on an advertising campaign of their own to supplement that of the chamber. This advertising will start Wednesday of the week before the shows. A synopsis of material to be used in the newspaper displays will be sent to all dealers in the country.

The Motor and Accessory Manufacturers' Association has joined with the N. A. C. C. in a determined effort to prevent profiteering by the hotels during the show, and their efforts have been even more successful than had been expected.

PUBLIC WORK KEYNOTE OF SHOW ADVERTISING

NEW YORK, Dec. 21—Here is the keynote which will be sounded in the advertising campaign to be conducted by the National Automobile Chamber of Commerce in connection with the New York and Chicago shows:

America this year must spend ten billion dollars for public work.

Railroads will be rebuilt. Highways will be improved and extended.

Thousands of school buildings must be erected. There is a shortage of hotels, houses, hospitals, etc.

These works have been neglected for three years. There can be no delay in starting.

Money, labor and materials are ready.

Prosperity is certain.

Without automobiles the work cannot be done.

A million cars are required for replacements alone.

Every large hotel in New York with one exception has agreed to maintain its regular rates.

Preparations for the chief events of the week supplemental to the show are well under way. These events include four important dinners. They are:

Rubber Association of America, at the Waldorf, Monday evening.

National Automobile Chamber of Commerce, Commodore, Tuesday evening.

Motor and Accessory Manufacturers Association, at the Commodore, Wednesday evening.

Society of Automotive Engineers, at the Astor, Thursday evening.

Truck Committee To Meet

The motor truck committee of the National Automobile Chamber of Commerce will hold one of the most important meetings of its history Wednesday and the directors of the Chamber will meet Thursday. The annual meeting of the Rubber Association will be held Jan. 10, and important conferences of the Motor and Accessory Manufacturers' Association directors will be held in the week.

While no foreign made cars will be exhibited at the show, many European manufacturers will attend the exposition. It is understood that included in the number will be Sir Herbert Austin, who will not only visit the show but will have supervision over a display of several Austin cars at the Waldorf. Applications for space were received from four British manufacturers, one French, one German and one Swiss.

Vehicle Law Ready for State Action

Motor Vehicle Conference Committee to Send Copies to All Legislatures

NEW YORK, Dec. 18—A new edition of the "Proposed Uniform Vehicle Law," drafted by a joint committee representing the National Automobile Chamber of Commerce, the American Automobile Association, the Rubber Association of America, National Automobile Chamber of Commerce, the Motor and Accessories Association and the Trailer Manufacturers' Association of America, is just off the press. A copy of this important volume will be placed in the hands of each member of the forty-two State legislatures that meet early next year.

Within the last few days copies have been distributed of the "Proposed Uniform Vehicle Law" drafted by a committee named by the International Traffic Officers' Association. This law was reported to the executive committee of the Traffic Officers' Association in Cleveland, Dec. 6.

The question was there raised that this law too strongly indorsed certain signalling devices. As a result of this discussion the associations represented in the Motor Vehicle Conference Committee withdrew from the association. The draft of the proposed law now being circulated was never indorsed.

SPAIN INCREASES DUTIES

PARIS, DEC. 5 (Special Correspondence)—Spain has just increased her automotive import duties. Cars with open bodies have to pay a duty of 240 pesetas per 100 kilos (220 lb.) plus a fee of 600 pesetas. With closed bodies the fee is increased to 900 pesetas. For chassis only the duty has been increased from 80 to 240 pesetas per 100 kilos, when the total weight is less than 2200 lb. Trucks and motor buses pay 60 pesetas per 100 kilos. The duty on motorcycles has increased from 3 to 9 pesetas per 100 kilos. On band tires the increase is from 1 peseta 20 to 1.80 per kilo, and on pneumatics the jump is from 2.70 to 8.10 per kilo.

FAVOR BUS AS AUXILIARY

NEW LONDON, CONN., Dec. 18—A resolution from the Hartford Chamber of Commerce asking the Connecticut Chamber of Commerce to favor passage by the next legislature of such measures as will permit trolley companies to use auxiliary motor service, has been approved by the resolutions committee of the State body.

No Combine Found in Tire Industry

Business Is Shown Highly Competitive

Anti-trust Charges Against "Big Six" Not Substantiated Before Federal Jury

CLEVELAND, Dec. 17—After a thorough and searching investigation of charges that the so-called "Big Six" companies in the rubber tire industry had violated the Sherman Anti-Trust Law, the Federal Grand Jury of the United States District Court of this city reported to-day that no indictments had been returned.

So important was the investigation, which started here last week, that the United States Department of Justice at Washington sent Edward Gann, Roger Shale and Oliver Pagin, special assistants to United States Attorney General A. Mitchell Palmer, here to assist the local district attorney in the probe.

Joseph C. Bierenstein, first assistant United States District Attorney, of this city, who has had charge of the more important Grand Jury investigations here in the past, had charge of the probe and through him the men sent on from Washington presented their evidence to the Grand Jury. More than 100 witnesses, including men high in the counsels of the larger rubber companies, and others outside of the industry, who claimed to have facts bearing on the charge made at Washington against the "Big Six," were subpoenaed, and they testified before the Grand Jury.

The investigation extended to operation of the companies throughout the United States, and witnesses were present from all parts of the country, many coming from New York City and Akron, where three of the companies involved in the probe have their home offices.

The companies which bore the attack of the Government and which came out of it without having to stand trials and charges of violating the anti-trust law are the Goodrich, Goodyear and Firestone of Akron; the Ajax, United States and Fisk.

Investigation Details Secret

Bierenstein and others in charge of the probe refused to comment on the investigation, which was conducted with as great secrecy as possible. It was learned from other sources, however, that the Government decided to act after a communication was received at the offices of the Department of Justice in Washington, in which it was charged that the Big Six, which controls approximately 80 per cent of the rubber trade in the United States, were in a conspiracy to fix and maintain uniform

prices. Acting on this tip, it was learned that W. F. Ficklen, of the Department of Justice at Washington, gathered evidence bearing on the charge. The probe was started here because of the proximity of this city to the companies at Akron.

At the district attorney's office no information could be obtained as to what direct acts were charged against the companies, but it was learned evidence was given that the rubber trade is highly competitive, and that more than 200 companies manufacturing tires are quoting nearly 180 different prices on same sizes of tires.

Jurors Studied Conditions

It was learned that the jurors went extensively into present business conditions, and were told that on account of large overhead and small demand practically every company in operation was losing money to-day. Although it cannot be stated definitely what was in the minds of the grand jurors when they voted "no bill," it is thought that the jurors concluded that in view of present trade conditions, the evidence presented was not sufficient to warrant putting on the companies involved a new burden.

The jurors not only heard witnesses for the Government against the companies, but the executives of several of the larger rubber companies were permitted to testify. Among them were Messrs. Rutherford, vice-president of Goodrich; Rockhill, vice-president of the Goodyear, and Partridge, vice-president of the Goodyear, all of Akron.

The activities of the American Rubber Association also were delved into, and witnesses presented records that were illuminating. Messrs. Vorhis of Chicago and Christie of Des Moines, Iowa, executives of the Midwest Rubber Association, told of the work of their organization. The action of the Grand Jury ends the investigation and leaves the company free to continue business without fear of being haled into court to stand trials on criminal charges.

The position of those in charge of the investigation, it was learned from outside sources, was that a serious charge having been filed against the companies, in justice to public and to the companies concerned, a thorough investigation was imperative. The Government went vigorously after every bit of evidence available, and it all was presented to the jurors.

NEW BRITAIN CLOSES PLANT

NEW LONDON, Conn., Dec. 18—Giving the general business depression as the cause, the New Britain Machine Co., manufacturers of tractors and other machinery, normally employing about 600 hands, closed its plant yesterday, to remain idle until Jan. 3.

Advertising Methods to Meet Discussion

M. & A. M. A. Managers to Hold Important Session During National Show Week

NEW YORK, Dec. 21—"How Advertising Can Turn the Tide in the Automotive Industry," will be the key-note of an important meeting of the advertising managers council of the Motor and Accessory Manufacturers Association to be held at the Hotel Astor, Jan. 7. A large attendance is assured, since most of the advertising executives of automobile companies will be in New York for the automobile show. A comprehensive program has been arranged by the executive committee of the council.

One of the features will be an open forum discussion on "My Best Advertising Bet for 1921." This will be a brass-tacks exchange of ideas and experiences on increasing the efficiency of the advertising dollar in the face of current conditions in the industry.

"Selling the Automotive Industry to America—the Spirit of Transportation," will be the title of a paper by E. W. Clark, advertising manager of the Clark Equipment Co., Buchanan, Mich.

Alfred Reeves, general manager of the National Automobile Chamber of Commerce, will discuss "The Outlook for the Automotive Industry in 1921—Co-operation Between the Advertising Managers of the Car Manufacturers and the Parts and Unit Makers."

"A Review and Forecast of Business," with particular reference to the automotive industry, will be presented, with detailed statistical charts, by C. C. Parlin, manager of the commercial research department of the Curtis Publishing Co., Philadelphia.

A novel feature of the meeting will be an exhibit of members' advertising. The various advertising executives have been invited to mount on suitable frames specimens of their significant and particularly interesting advertising material.

HARVESTER MAINTAINS WAGES

AKRON, Dec. 20—The wages of employees of the Akron motor truck plant of the International Harvester Co. will not be reduced following decision of the works council of the factory. The eight-hour day recently adopted by the company will continue instead of a nine-hour day. The works council consists of fourteen men, seven of whom are officials and seven representing employees. Production of the company has slowed down somewhat due to the general business depression.

Overland to Avoid Heavy Production

Will Manufacture Only to Meet Sales—Edwin B. Jackson Reported Resigned

NEW YORK, Dec. 20—Production will not be resumed Jan. 3 in the plants of the Willys-Overland Co. as had been expected. When the making of cars will be undertaken again has not been determined. It can be stated that the reason for the delay is found in the condition of the market. The company does not believe the times are auspicious for the turning out of motor vehicles in large numbers, and when manufacturing is started again it will be on a scale adequate to meet actual demands and no more. As a matter of fact, this is the present policy of all the Willys' companies. Business prudence, it is felt, makes operating economy essential and the conservation of cash wise. This is demonstrated by the passing of the quarterly dividend on the preferred stock of Willys-Overland. In announcing this action the directors issued a statement in which it was said:

"Notwithstanding the preferred dividend of Willys-Overland has been earned for the full year by a very wide margin, directors consider it to the ultimate advantage of the company to conserve cash resources until normal conditions again prevail in the industrial and financial worlds.

"Until the period of readjustment in the motor industry, now in progress, has been completed and abnormal credit conditions relieved, the company will pursue a conservative manufacturing program looking toward the reduction of inventories and the establishment of the utmost manufacturing and merchandising efficiency. To that end several changes in executive personnel have been made.

"The financial position of the company has been considerably strengthened by this program. At the present time quick assets are in the ratio of approximately two to one to liabilities."

No amplification was obtainable at the office of Walter C. Chrysler of the statement that several changes in the executive personnel had been made. The most important of these, of course, was the resignation of Clarence E. Earl as first vice-president.

Reticent on Jackson Action

There have been persistent reports that Edwin B. Jackson, vice-president in charge of sales, has offered his resignation and that it has been accepted, but Chrysler said he could not discuss the subject until after Jan. 1. It is understood other important changes are contemplated, if they have not already been made.

The air has been filled of late with speculation and rumor about Willys-Overland and the whole Willys organization. Most of these reports have been entirely without foundation or the rea-

sons for steps which have been taken have been misconstrued.

It can be said on authority that Willys-Overland is not by any means in dire need of funds. All its bank loans have been renewed and no important financing will be necessary for some time to come. When this financing is undertaken it will be on a permanent rather than a temporary basis, and it is likely to include all the Willys enterprises. Some kind of security probably will be offered in the refunding operation instead of having it on a stock basis.

Liabilities Reduced \$18,000,000

Current liabilities on Nov. 30 of the Willys-Overland Co., including bank loans, accounts payable, trade acceptances and obligations to note brokers, stood at approximately \$26,750,000. This marked a reduction of about \$18,000,000 as shown by the balance sheet of April 30 last.

Willys-Overland was shown to be no worse off than many other industrial concerns that are now suffering from deflated inventories, frozen credit and the falling off in the demand for their products.

Total assets of the Willys-Overland Co. on Nov. 30, exclusive of goodwill, patents and deferred charges, amounted to \$125,000,000. Of current assets approximately \$4,500,000 consists of cash.

Regarding the personal affairs of John N. Willys, it can be said that he is in no way involved in the obligations of the Willys-Overland Co. Willy's stock market operations have not at any time been important and he has no important commitments now.

Fisher Body Merger Is Reported Near

NEW YORK, Dec. 20—Plans for the absorption of Fisher Body Ohio Co. by Fisher Body Corp. of New York are reported to have been completed and await formal action by the officers of the two companies. Fisher Body Corp. of New York, which is controlled by General Motors, owns a controlling interest in the Ohio company.

To effect a closer relationship, subject to further corporate action, Fisher Body Corp. has offered to exchange one share of its present common stock for five shares of the Ohio company common, and in addition to pay to each stockholder of the latter company \$2.50 for each share so exchanged.

Fisher Body Corp. will agree to pay current dividends on the preferred stock of the Ohio company, it is understood, and to pay off present accumulated dividends thereon within eighteen months. Accumulated dividends this year amount to \$8 a share. Directors of the Ohio company are understood to be in favor of the exchange and will recommend it to stockholders.

DORT TO ADVANCE PRICES

DETROIT, Dec. 20—Prices on the Dort car will be increased Jan. 1 as follows: Touring car and roadster, \$1,085 to \$1,215; coupe, \$1,765 to \$1,865; sedan, \$1,765 to \$1,995.

Hub Standardization Reduces Hub Sizes

Front Wheel Truck Axle Dimensions Tentatively Reduced to Five Standards

DETROIT, Dec. 17—The matter of the standardization of hub design which has been under consideration by the Automotive Metal Wheel Manufacturers' Association and other organizations, was discussed at a meeting held here yesterday. The meeting was attended by over twenty representatives of the concerns in this line of business and Cornelius T. Myers, consulting engineer who has been in charge of the preliminary work, presented his report.

The first matter to be standardized is front wheel hubs for truck axles. With the co-operation of axle and truck manufacturers, Myers has succeeded in tentatively reducing the number of sizes to five, and tentative dimensions for covering these five sizes have been drawn up and blue printed and were yesterday submitted to the meeting for approval insofar as the general scheme of standardization is concerned. This general approval was expressed.

The Metal Wheel Association, as well as the Wood Wheel Association, has been working for a little over a year on the standardization of hubs and has had the co-operation of the Society of Automotive Engineers in this work.

The move has the hearty co-operation of axle as well as bearing manufacturers, who have gotten behind the movement, not only for the sake of the wheel manufacturer, but also to reduce the number of axle designs on the market and to greatly simplify service problems. The program of future work will include passenger car fronts, and eventually rear axles on both trucks and passenger cars, as far as possible. Full details regarding the advantages of such standardization and the ideas behind the work have been printed in AUTOMOTIVE INDUSTRIES for April 1, April 29 and August 19, 1920.

Many Manufacturers Represented

Those present at the meeting were: R. L. Walker, J. H. Hammes, F. J. Storm, Sewell Cushion Wheel Co.; W. J. Bryan, Budd Wheel Corp.; F. Jehle, Aluminum Castings Co.; A. L. Putnam, H. A. Coffin, Detroit Pressed Steel Co.; W. E. Williams, American Steel Foundries; C. B. Wisenburgh, Standard Steel & Bearings, Inc.; R. P. Dowse, H. G. Norris, Goodyear Tire & Rubber Co.; H. H. Jackson, Wire Wheel Corp.; Walter E. Robertson, Robertson Resilient Wheel Corp.; Geo. L. Lavery, Jr., R. H. West, George L. Lavery, West Steel Casting Co., Willis Stutson, A. M. Lafland, Indestructible Wheel Co.; R. J. Burrows, Clark Equipment Co.; J. S. Hegeman, Bethlehem Steel Co.; C. T. Myers, consulting engineer; Robert Porter, Jaxon Steel Products Co.; J. E. Schipper, AUTOMOTIVE INDUSTRIES.

Railroads to Build Motor Truck Lines

New York Agricultural Conference Shows Carriers Soon to Augment Service

NEW YORK, Dec. 20.—Full recognition was given the important part played by motor vehicles in the development of farm life at a meeting held at Syracuse Friday to frame a definite and constructive agricultural and economic program for New York State. The conference was called by the State Department of Farms and Markets and was attended by representatives of all the agricultural organizations in the State, bankers, railroad executives, educators, prominent women and the National Automobile Chamber of Commerce.

F. W. Fenn, secretary of the motor truck committee of the N. A. C. C. was prepared to do missionary work for the truck but found little was needed. Even the railroad men, who have regarded motor vehicles with distinct suspicion until recently, readily admitted the value of the truck for short haul traffic, especially in agricultural regions. They have found that the tonnage it hauls feeds their lines and it is no secret that several of the carriers soon will be in the market for large numbers of trucks to augment the service given on their rail lines.

One of the most important steps taken at the meeting was the appointment of a committee on transportation, including Fenn and several railroad officials as well as representative of organizations of shippers, to co-ordinate all the elements of transportation as they relate to the farm. It was unanimously agreed that rural motor truck lines increase the efficiency of marketing and that efforts should be made to stimulate the development of these lines under co-operative ownership.

The good roads question also was given serious consideration. It was maintained that the improvement of side roads would do much to give access to shipping points. The majority of the farmers of the State were said to be without improved highways and compelled to use in spring and fall, roads which are almost impassable.

To Improve Rural Transport

The Departments of Farms and Markets is prepared not only to do everything possible to improve the rural transportation facilities in the State but it proposes to take effective steps to save the enormous quantities of farm products which are lost each year because it is impossible to market them to advantage. The chief means proposed to doing this is by the erection of co-operative warehouses in each county where fruit and vegetables can be stored until conditions are most favorable for marketing them. It is believed that in this way the consumer will get the benefit of huge quantities of fruit which now are allowed to rot on the ground.

DEPRESSION NEARS ZERO POINT

WASHINGTON, Dec. 20.—The bottom of the present business depression will be reached in the next thirty days, in the opinion of Archer Wall Douglas, chairman of the Committee on Statistics and Standards of the Chamber of Commerce of the United States in his monthly report on general business conditions, made public to-day in the Nation's Business.

"Advances of any moment in the prices of agricultural products will materially change the situation for the better, and reductions in the prices of commodities are likely to cause increased business in all industrial sections," said Douglas.

The report pointed out that "acute phases of the present depression will wear away steadily as the public adjusts itself to changed conditions brought about by a return to normal. Unfavorable agricultural situations, especially, have an unexpected way of remedying themselves."

Sheridan to Make Appearance This Month

NEW YORK, Dec. 20.—The election of Pierre S. du Pont as president of the General Motors Corp., to succeed W. C. Durant, means no change whatever in the plans and operations of the Sheridan Motor Car Co., the latest member of the General Motors group. This is the assurance given by D. A. Burke, president of the Sheridan.

"We are more than pleased with the progress already made at our plant in Muncie, Ind.," said Burke, "and we are especially gratified to note a constantly greater interest in the Sheridan and a growing demand for it. Our dealer connections now extend from coast to coast, in the principal cities. The demand for our car is already in excess of production, dealers having voluntarily sent us orders for more than 2000 cars.

"Our eight-cylinder car will make its appearance this month. Closed jobs in both four and eight-cylinder types will be ready for public inspection in a short time."

LAKEY GETS TRUCK ORDER

DETROIT, Dec. 17—International Motor Truck Co. has placed an order with the Lakey Foundry & Machine Co., Muskegon, for from 4000 to 7000 motor truck castings, which the factory is expected to turn out at the rate of 75 a day. This order will enable the Lakey company to operate on its present basis of about 10 per cent of capacity for some time to come. The Lakey company formerly was employed to full capacity on Continental Motors Corp. work. The latter company is now turning out about 40 engines a day.

Government Gathers Implement Figures

Compilation of Statistics Expected to Show Extent of Motorization of Farms

WASHINGTON, Dec. 18—Questionnaires will be sent to all manufacturers of farm equipment in an effort to collect information as to the extent to which farmers are using machines and other equipment. This census is under the direction of the Division of Agricultural Engineering of the Bureau of Public Roads. The survey will include tractors, trucks and all vehicles and implements. The inquiry will depend to a large extent upon the co-operation of manufacturers.

The National Implement and Vehicle Association will co-operate in this endeavor of the Department of Agriculture. The data will deal with sales, domestic and foreign, as well as manufactures for 1920. The reports of the individual manufacturers will be held confidential and the information given will be used exclusively in the compilation of statistics. The questionnaire method has proved effective in the annual surveys of the Office of Farm Equipment Control. This office recently made public a study of the production and sale of tractors.

In an official statement explaining the object of the census, the Department of Agriculture said "the use of improved equipment by farmers in this country is necessary for the welfare of agriculture, and it has had much to do with the prosperity of American farmers as compared with other countries. The importance of the farm implement and vehicle industry has long been recognized, but little information regarding its size as compared with other industries has been available. Such figures also will furnish a better basis for estimating the extent to which farmers are using machines and equipment, and the amount invested annually."

Goodrich Reorganizes Engineering Division

AKRON, Dec. 18—Under S. B. Robertson, director of engineering of the B. F. Goodrich Co., who succeeded George Perks in that capacity, the Goodrich engineering department has been re-organized and put upon an entirely new and unique basis, with B. H. Clingerman, formerly managing power engineer, now in the capacity of consulting engineer for the company.

Clingerman has been with the Goodrich Co., for over two years. Under the reorganization announced by Robertson, J. H. Vance, former superintendent of power becomes power engineer. W. C. Hoover is the designing engineer, B. C. Mitchella, the structure engineer, E. D. Barry, material engineer; V. A. Parker, molding engineer, and W. F. Pierce, master mechanic. E. F. Myers and F. E. Blower are assistant master mechanics and W. P. Sheely is chief inspector.

Aeronautic Bureau Urged Upon Congress

Would Encourage and Regulate Commercial Aviation and Stimulate Developments

WASHINGTON, Dec. 18—Recommendations have been submitted to Congress by the National Advisory Committee for Aeronautics for the establishment of a Bureau of Aeronautics in the Department of Commerce for the regulation and encouragement of commercial aviation and for the authorization to conduct an American airplane competition in order to stimulate private endeavor in the development of new and improved designs of aircraft.

No definite plans for this competition have been made, because of the uncertainty, but it is intended, in the event Congress approves the project, to have the successful entries purchased by the Government at a predetermined and announced figure and made available for the postal service.

The legislative body has been asked to approve the proposed national aviation policy formulated by the Advisory Committee.

The committee wants \$131,600 for research into power-plants which they believe to be a necessity for the development of aviation. It is asserted that the capital investment, maintenance charges and fuel cost are all very high in the case of the present aircraft engine and must be materially lowered before the cost of power can be reduced to figures which will make possible the extensive development of commercial and pleasure aviation. The shortage and high cost of aviation gasoline, as well as the complication and relative unreliability of the carburetion and ignition systems, emphatically indicate the necessity for the development of an engine which will operate by direct hydraulic injection of low-grade fuel, with compression sufficiently high to ensure automatic ignition. The committee feels that the early development of an engine of this type is one of the most important technical problems involved in the growth of commercial aviation in this country.

Eliminate Water Cooling

"Perhaps," says the committee, "the next most important power-plant problem is the elimination of the water-cooling system, it being at present agreed that the added complication, weight and head resistance of the indirect cooling system are to be considered as fundamentally unnecessary handicaps to power-plant performance and reliability, and that these must ultimately be overcome. Although considerable research has been conducted upon the direct cooling of engine cylinders, the results must be considered as merely indicative and much yet remains to be done before the successful and economical direct cooling

of aircraft engines will become possible, especially with cylinders of large dimensions and high specific power output."

The program covers the requirements in this problem in a comprehensive manner.

The perfecting of supercharges, or other means for securing the maximum power output of aviation engines at all altitudes is considered to be one of the vital problems and the program provides for a continuation of the research examination of the many possibilities offered in this field. All of those applications of commercial, military and pleasure aviation which depend upon high speed for their successful fulfillment can only reach their complete development through flying at high altitudes with power plants capable of maintaining a high percentage of their maximum power output and equipped with variable pitch or variable characteristic propellers.

To Continue Performance Tests

The program also contains provision for continuing the performance tests of new types and improved forms of aircraft engines in the altitude chamber; the performance tests of all engine accessories such as carburetors, ignition appliances, lubrication appliances, and cooling appliances, including radiators in the form of complete units and also sample cores; and the study of other interesting developments of important engine details, such as pistons, valves, etc.

The two-cycle fuel injection automatic ignition engine appears especially promising. The problems incident thereto are being energetically studied abroad and some work is being done in this country. In particular, the Bureau of Engineering of the Navy Department has recently approved a fuel injection research program to be carried out at the Langley Memorial Aeronautical Laboratory, as the development of a successful engine of the fuel injection type is of especial interest to the navy in connection with the power plants of large airships.

Outline Immediate Studies

The program for the immediate future covers the study of the phenomena of fuel injection by means of a special glass-walled pressure chamber, in which many of the engine-operating conditions may be simulated, equipped with apparatus for taking very high-speed photographs of the events occurring in the pressure chamber. The results are to be applied to an experimental engine and a study made of the possibilities of the double-piston two-cycle engine in this connection. The problem of altering standard carbureted four-cycle engines will receive attention as well.

The direct air-cooled engine offers important possible advantages which have been studied by foreign laboratories and to a small extent by those in this country, largely in connection with the general problem of radiation. In connection with direct fuel injection, the air-cooled engine is especially interesting as looking toward the increase of thermal

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Highway Officials Seek More Trucks

War Department to Consider Request—Ask \$100,000,000 a Year for Roads

WASHINGTON, Dec. 18—Extension of the Federal aid program at the rate of \$100,000,000 annually for four years, has been recommended to Congress by a committee representing the American Association of State Highway Officials, which convened here this week. It was suggested that in public land States the funds should be available for two years after the period for which appropriated. The convention adopted a resolution urging additional transfer of trucks and other surplus material owned by the War Department.

The sessions of the convention were closed and the discussion confined to topics of vital importance to the highway engineer. The subject of snow-removal, which is important to truck manufacturers and users, was not under consideration. It was stated that the delegates talked of the feasibility of the office of Public Roads to prescribe limiting loads on Federal aid highways, classification of vehicles and highways.

A. R. Hirst, State Highway Engineer for Wisconsin, in discussing the relative service value of rural pavements, declared that "it would seem that it would be clear to even the feeblest minded that it is not going to be possible for the designers of vehicles using highways to turn loose upon the highways any behemoth their ingenuity may design at any time they feel like doing so. It isn't possible to reconstruct the highway system of America every few months, or even every few years."

He believes that it is imperative that the several States should adopt uniform standards for loads to be borne by roads of the different classes of importance. It seems inevitable, Hirst said, that highways must be classified and traffic made to conform to load limits. He advocated that highway engineers offer more consideration to the traveling public in keeping certain highways open during construction. "The road problem of America is not to build a few boulevards, it is to build, maintain and keep always open a transportation system," Hirst declared in advocating traffic distribution over several roads.

Would Divide Road Classes

In this connection, Charles J. Bennett, State Highway Commissioner for Connecticut, in suggesting the separation of highways into classes, pointed out the necessity of correlation between primary and secondary highways. He recommended that these roads should be designed to provide for the efficient use of the motor vehicle for commercial purposes without infringement on other means of transportation. Bennett said

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Commerce Chamber Seeks Tax Views

Questionnaire Is Mailed to Representative Organizations— Sales Tax Is Opposed

WASHINGTON, Dec. 20—Opinion of representative American business organizations on tax matters has been asked in a questionnaire sent out to-day by the Chamber of Commerce of the United States on a proposed program of Federal tax revision. The proposals submitted to a vote were compiled by the committee on taxation after a year's study of the problem from the standpoint of American industry.

Because it is the excise taxes that strike hard at the automobile industry, it is significant to note that the committee has recommended that "there should be excise taxes upon some articles of wide use but not of first necessity. Such taxes, the committee believes, should fall only on commodities—ordinarily at the point where the article takes its finished form and is ready to enter the channels of distribution—and should be levied only once on each commodity."

Possible opposition to this is voiced in the negative argument on the ground that inequalities would be produced and that, constituting additions to prices, these taxes would handicap various industries.

As the committee recommended against the sales tax its report in this case furnishes the negative argument. A turnover tax, it holds, would not be simple of administration; it would be pyramided, causing higher prices; its yield would be uncertain; it would work to the advantage of large industrial establishments which begin their processes with the raw material, carrying manufacture on to the completed article; it would tax but once foreign goods admitted; it would be unfair to persons at the bottom of the economic scale, on whom it would fall disproportionately heavier than on those who enjoy a wider margin between income and necessary expenditure.

Sales Tax Status Questioned

A final objection by the committee is that there would seem to be legal difficulties in the way in view of the fact that the Supreme Court has made it clear that such a tax is not authorized by the income tax amendment and that there is a question as to whether the courts would hold it to be a direct or an indirect tax. If a direct tax, it would have to be apportioned among the States, obviously an impracticable procedure.

The argument supporting the sales tax holds that difficulties of administration would not be so numerous as in administration of the excess profits tax; that it need not be pyramided; that means might be found to prevent advantage to integrated industries and to foreign goods; that it would have great practical value in that the business man would know exactly what he must turn

AUTOMOTIVE INDUSTRIES THE AUTOMOBILE

over to the Government and in that in the absence of especial incentive to evade it collection would be excellent; that it would be easier for persons of small incomes to pay than are heavy indirect taxes they now pay; that fewer persons would escape taxation. Administration of the tax in France, Canada, and the Philippines is cited.

Ericsson Creditors Get 60-Day Extension

NEW YORK, Dec. 21—The merchandise creditors committee of the Ericsson Mfg. Co. of Buffalo has been given an extension of sixty days in which to file an answer to the bankruptcy petition against the company and will request the receivers also to put in an answer denying allegations of insolvency. A careful survey of the plan discloses that the assets approximate \$900,000 after the most liberal allowance for depreciation of inventory and not taking into account good will and other intangible assets. The liabilities are about \$1,000,000 and orders on the books amount to \$1,500,000. The inventory was valued at much less than its actual replacement cost.

The creditors committee headed by W. M. Nones has taken a decided stand against the position of the receivers in not opposing bankruptcy. Notwithstanding this attitude of the receivers, both of them, when questioned by Sidney S. Meyers, counsel of the committee, virtually admitted that the company was well worth saving.

Ryan Indebtedness Funded for Two Years

NEW YORK, Dec. 21—An agreement has been practically reached between Allan A. Ryan and the committee of bankers who decided recently to take over his affairs as a means of protecting themselves from loss because of the shrinkage in the market value of securities pledged as collateral for loans aggregating \$16,000,000. It is understood the agreement provides that the Ryan indebtedness is to be funded for a term of two years with the assets held as collateral placed in the hands of trustees. If this agreement finally is signed it would appear to make it certain there will be no change for some time to come in the control of the Stutz Motor Car Co.

TO PIPE OIL TO BEHRING SEA

OTTAWA, Dec. 17—Conveyance of the oil products of the Mackenzie River basin to Behring Sea by pipe line from whence it would be carried by tankers to the markets of the world, is an ambitious project for which sanction will be sought by a bill to be considered by Parliament at the approaching session. The proposed pipe line would be laid from the Mackenzie River to the Yukon River systems by way of Rat River, thence by the Porcupine and Yukon rivers to salt water.

N. A. C. C. to Present Tariff Suggestions

House Committee Sets January 14 for Hearing—Would Lower Present Rate

WASHINGTON, Dec. 18—Chairman Fordney of the House Committee on Ways and Means has announced that representatives of the automobile industry may present their suggestions as to tariff revisions before the full committee on Jan. 14. The tentative proposals of the foreign trade committee of the National Automobile Chamber of Commerce call for a reduction of the present tariff of 45 per cent to 30 per cent and the establishment of reciprocal relations, particularly with Canada.

It is understood that T. Walter Drake will appear in behalf of the N. A. C. C. The discussion will be confined to Schedule C, paragraph 116, which covers automotive products. The committee has asked that in the preparation of briefs attention be given to the importance of the industry, its development and future prospects; domestic production, costs and wages, and comparable costs and wages in foreign countries and dumping activities of foreign firms.

The fact that the industry will urge a revision downward in the tariff is somewhat unusual because the new Administration is committed to high tariff policies. It is assumed, however, that tariff changes will be made whenever it is demonstrated that such a course will increase production and revive business generally.

Holt Farm Light Formed to Take Over Automatic

TOLEDO, Dec. 18—The Holt Farm Light Co. has been incorporated in Ohio for \$1,000,000 and will locate in this city. The new company takes over the Automatic Light Co. of Ludington, Mich., manufacturers of the Holt 110 volt direct current, without storage battery, farm light plant. Originally an Ohio product, designed by Scott J. Matthews of Port Clinton, Ohio, the unit now after three and one-half years of manufacturing in Michigan will soon come to Toledo for its permanent home.

The company elected the following officers: L. W. Holt of the Automatic Light Co., president; S. H. Humphries of Detroit, vice-president, and H. K. Greenman of the Automatic Light Co., secretary and treasurer. In addition to these officers, the directors are A. E. Kowalk, John E. O. Feller, W. W. Headings, and George H. Moore, Jr.

The plant at Ludington will be continued for such time as required to get a site in Toledo. Arrangements, however, will be made at once in this city for at least 50,000 feet of floor space in which to assemble the unit, the various component parts being manufactured at Ludington until it is possible to make the complete unit in this city.

Special Cables

French Grand Prix
to Be Held July 23Paris Automobile Show Places
American Exhibits Last as
Protest on Duty

(By Cable to AUTOMOTIVE INDUSTRIES)

PARIS, Dec. 20—The date for the French Grand Prix has been fixed as July 23. It probably will be held at Strasbourg. The Belgian Grand Prix will be held on Aug. 13 and the Italian on Sept. 4. All the races are for cars with engines of 183 cu. in. piston displacement.

The next Paris automobile show will be held in the Grand Palais from Oct. 5 to 16. Exhibits from the late enemy nations will not be admitted and American manufacturers will be given places only after the requirements of all other nations have been met. This ruling has been made as a protest against the pre-war American import duty of 45 per cent.

Exhibitors at the Paris Salon must undertake not to participate in any race or competitive exhibit unless it is approved by the National Federation of Automobile Manufacturers. As only the French Grand Prix has been approved up to the present time, smaller firms are protesting against being shut out from competing in events which interest them. It is declared that while this agreement applies to all of Europe it will not affect the United States.

According to reports from London, the English show will be held in September in order to get ahead of Paris. This seems unlikely, but in any event the Paris date will not be changed, as September is not a suitable month for an automobile exposition.

The special general meeting of the Berliet Company to consider a reduction of capital by annulling \$4,000,000 of founder shares, attributed to Marius Berliet in 1917, did not come to any decision, as the president stated negotiations were pending which would make the move unnecessary. This sudden change of front caused surprise among the creditors who are beginning to insist that their bills be paid.

A bill just submitted to the French Parliament provides for the control of the petroleum industry. Under the measure, importing and refining could be carried on only under a permit granted by the ministry of public works. Holders of these permits would be compelled to comply with certain conditions regarding the development of French oil

French Automotive Exports Grow \$230,342,000;
Imports Are Reduced \$42,000,000 or 38 per Cent

PARIS, Nov. 30 (Special Correspondence).—French automotive exports stand at \$281,405,400, nominal exchange rate, to October 31, according to official statistics of the Ministry of Finance. The biggest single item in this total is \$142,919,400 for passenger cars and chassis; tires come second on the list with a value of \$66,826,200, with trucks in third place. All other items are comparatively small. Compared with the corresponding period of 1919, the increase on French automotive exports is \$230,342,400, or 451 per cent. The increase on passenger cars only is \$134,900,400, or 1682 per cent.

The increase in French automobile exports is enormous when compared with the pre-war period, for in 1913 the total was \$45,489,400, while for 1914, which includes four months of war, the total was \$42,429,400. In making a comparison, however, it should be borne in mind that the individual value of the automobiles exported is now very much higher than before the war, thus the number of cars sent abroad has not increased in the same proportion as the total value of the exports.

French automotive imports show a drop of 38 per cent for the first ten months of the year, the figures in 1919 being \$109,129,000, compared with \$67,580,600. Trucks head the import list, with bicycles second and passenger automobiles third. Practically all items are stationary or show a drop with the exception of bicycles, which have been increased by reason of important arrivals from Germany. Following are detailed official figures:

	1919	1920
Automobiles (passenger and chassis)	\$8,019,000	\$142,919,400
Tires	31,499,200	66,826,200
Automobile trucks	5,026,200	58,811,800
Airplanes	4,788,400	6,970,600
Bicycles	1,104,000	3,709,800
Automobile bodies	187,600	632,600
Motor cycles	77,400	609,400
Motor boats	10,000	561,000
Flying boats	208,400	198,400
Spherical balloons	142,800	166,200
Totals.....	\$51,063,000	\$281,405,400
 FRENCH IMPORTS		
Automobiles (passenger and chassis)	\$4,142,400	\$3,100,800
Tires	36,011,000	24,183,400
Automobile trucks	64,295,800	34,645,600
Airplanes	497,800	547,200
Bicycles	1,457,200	3,355,000
Automobile bodies	1,673,600	1,223,000
Motor cycles	960,200	428,600
Motor boats	33,000	97,000
Flying boats	58,000
Totals.....	\$109,129,000	\$67,580,600

fields, the construction of tank steamers and the installation of refinery plants. Monthly reports to the Government would be required regarding stocks imported and sold. The Government would have control over the supplies of fuel reserved for army and public services.

President Agnelli has resumed his position at the head of the Fiat Company, and the labor situation in Italy now is normal. Fiat is producing seventy automobiles a day.

BRADLEY.

AIR SERVICE FOR PHILIPPINES

WASHINGTON, Dec. 17—Five flying boats have been purchased for the Philippine Government by the Bureau of Insular Affairs from the Navy Department, to establish an aerial mail and passenger service between Manila and other large ports of the islands. The boats are two F-5-L and three HS-2-L, the former carrying thirteen and the latter type six passengers. The flying personnel consists of 30 Philippine National Guard officers who have been in training for six months. Service is expected to be inaugurated Jan. 1.

High Prices Hurt
American Exports

NEW YORK, Dec. 17—Cable advices to this country point out that the market for American products in Holland is being undermined by the excessive retail prices asked. The matter has been made the subject of a special report to the State Department by Consul General Anderson.

It was shown that automobiles selling at retail for about \$5,000 in the United States are sold in Holland cities for the equivalent of \$7,000, though the ocean freight charges are only about \$200 and the import duty only 5 per cent. This exacting of profits is declared to work a severe handicap upon the continuance of American automobile popularity in Holland.

BRITISH OIL FIRMS MERGE

NEW YORK, Dec. 18—News has arrived here of the forthcoming combination of the Shell Marketing and the Anglo-Mexican Petroleum Co., which will be perfected on Jan. 1 under the title of Shellmex, Ltd.

Bankers Discuss Goodyear Future

Decision Expected at To-day's Session

No Statement After Four-Day Conference—Wall Street Optimistic Over Outlook

SUIT DISMISSED!

COLUMBUS, Dec. 23—The suit brought by Frank S. Monnett, former attorney general, for the appointment of a receiver for the Goodyear Tire & Rubber Co. of Akron, was dismissed to-day by Judge E. B. Kinhead on the ground that the petition filed failed to recite sufficient facts to warrant a receivership. The demurrer of the Goodyear company was sustained.

NEW YORK, Dec. 23—Apprehension is felt throughout the industry as to the fate of the Goodyear Tire & Rubber Co. against which a receivership action has been filed in the courts at Columbus by Frank S. Monnett, former attorney general of Ohio, and the owner of forty-five shares of preferred stock. The petition makes numerous charges against the officers but the most serious factor is that it asks an injunction restraining new financing which had been virtually arranged when the papers were filed.

The offices in Wall Street of Goldman, Sachs & Co., who head the syndicate which had almost completed working out the details of a financing plan which would have provided a permanent loan of approximately \$40,000,000 for the great tire company, have been the scene of virtually continuous conferences since Monday morning. The atmosphere in these offices is filled with "addition, subtraction and silence" but mostly silence so far as Goodyear is concerned.

Loans Mature in February

No statement, formal or otherwise, has been issued as to whether the Monnett suit will result in abandonment of the financing plan. Temporary loans of \$25,000,000 will mature the middle of February and the major part of the funds which were to be provided were to take care of these obligations.

It had been hoped that some decision would be reached by the conference yesterday but it was said this morning the meeting would be continued to-day and that it was expected something would be decided "one way or the other" before night. The session to-day is the most important yet held and President Seiberling is in attendance. The bankers rep-

resented, besides Goldman, Sachs & Co. are William A. Reach & Co., Lehman Bros. and A. G. Becker & Co. of New York and Borton & Borton of Cleveland.

Most of those at the conference are expected to leave to-night for Akron to attend the meeting of directors called for to-morrow unless there is an eleventh hour decision to defer the meeting again.

The scenes have shifted so often in the last few weeks it has been difficult to follow the changes. It was realized nearly a month ago that actual control had passed to the bankers who had undertaken the temporary financing which was a preliminary to permanent loans.

Seiberling Driven To Banks

Only dire need drove President Seiberling to the bankers for he regarded their rates as usurious. The company sold \$28,000,000 worth of stock last June through its salesmen and it was hoped this would be adequate, but it was soon found the funds in hand were entirely insufficient. Seiberling then came to the New York bankers but went home disgusted when he found the rates they would charge. He then tried his luck in Chicago and met with somewhat better success. The result of these negotiations was the formation of the present syndicate headed by Goldman, Sachs & Co.

The intermediary in the negotiations between the Goodyear officers and the financial interests has been Frank H. Ginn, a Cleveland lawyer. In a statement announcing that plans had been practically matured for additional new financing to the extent of \$40,000,000 which would be ample to meet all the company's possible needs, he emphasized that there was danger of a destructive policy being precipitated in which case it would be impossible to go forward except through the long process of receivership and reorganization. The details of this financing were to have been discussed at the director's meeting Friday.

In his statement on the subject Ginn said:

"It was a primary part of this financing plan, already practically arranged, that a board of directors should be installed consisting largely of men residing in Ohio whose established character and position in the industrial and financial world would be such that all parties in interest, preferred and common stock holders as well as creditors, would be absolutely assured that the company's affairs would be wisely managed and that responsibility for any mismanagement which may have occurred in the past would be conscientiously sustained and any consequent liabilities to the company would be promptly enforced."

It has been learned that Goodyear expects to show assets of \$75 for each

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Akron Is Anxious Over Suit Outcome

Fear Monnett Action Will Be Serious Stumbling Block to Reorganization

AKRON, Dec. 21—The suit for receivership of the Goodyear Tire & Rubber Co. is a matter of serious concern both in Akron and in financial circles embracing banking groups prepared to arrange a permanent financing program.

Inasmuch as Goodyear stockholders at a meeting Friday are to be asked to ratify proposed re-organization of the company, the reduction of capital common stock from \$100,000,000 par to \$50,000,000, the placing of participating stock on a no par value basis and the issuance of not to exceed \$50,000,000 in gold mortgage bonds to make possible the permanent financing, pendency of Monnett's litigation, it is believed, will constitute a serious stumbling block, unless the courts of Franklin County should dismiss the suit, abate any application for temporary or permanent injunction, and deny the application for appointment of receivership.

According to the law firm of Tolls, Hogsett, Ginn and Morley, of Cleveland, legal representatives of Dauphinot and Cummings of New York, who represent Goldman, Sachs & Co., creditors who have advanced funds of \$25,000,000 to the Goodyear company temporarily, are satisfied with present conditions and the announced re-financing program, and are not disposed to support any move for a receivership. The loan, negotiated by Goldman, Sachs & Co., is payable Feb. 15, and it is stated upon definite authority, that the Goodyear company must consummate the permanent financing program for at least \$40,000,000 for a period of not less than ten years before the loan is due in February.

Monnett Charged Unloading

It is distinctly recalled by men in Goodyear acquainted with the situation that Monnett, at the time of issuance of the preferred stock, wrote to the company and to President Seiberling intimating that he had evidence substantiating the assertion then made that the company's officials were unloading their own stock and at the same time urging those on the outside to invest heavily in it. Monnett in that letter recited as unattested assertions, many of the things he now includes as definite allegations in his petition for receiver.

At the time the preferred stock was issued, Goodyear employees were advised to invest, an installment plan of

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Many Irregularities Charged by Monnett

Investment Company Actions Basis for Suit—Move to Quash Service Summons

COLUMBUS, Dec. 22—The Goodyear Tire & Rubber Co. has filed a motion to quash the service summons in the receivership case filed against it by Frank S. Monnett, former attorney general of Ohio, in the State Courts. The company alleges it has no agent in Franklin county and that the summons was served upon a man who merely is in charge of the supply depot in Columbus.

At the same time Frederick W. Freeman, who was made a co-defendant in the suit because he participated in the sale of stock, filed a demurrer to the receivership petition and alleged that none of the charges contained in it would stand in any way against him.

The suit filed by Monnett is directed against the company, all its directors and against all its subsidiaries, both domestic and foreign. Its main purpose is to restrain financing plans now under way and it also asks an accounting. In effect it charges the directors with malfeasance. Chief reliance seems to be placed upon the assertion that the Goodyear Investment Co. is owned by the directors and members of the executive committee and that it has been used by them to make enormous personal profits.

These are some of the charges made in the complaint:

That the Goodyear Investment Co. extravagantly purchased the Ford assembling plant in Long Island City for \$2,000,000 in addition to assuming a mortgage of \$1,750,000.

That the Investment company purchased a cotton plantation near Bakersfield, Cal., at a loss of \$15,000.

That the Investment company organized the Goodyear Tire & Rubber Co. of California and the Pacific Cotton Mills of California and purchased the entire capital stock of the cotton company at a loss of \$4,000,000.

That the Investment company purchased a 24,000 acre cotton plantation in Arizona at a loss of about \$500,000.

That it purchased 20,000 acres of rubber land in Sumatra at a loss of about \$500,000.

That the Investment company organized ten foreign corporations at a profit to itself of \$5,000,000.

That the stock issue last summer was illegal because there was no surplus instead of the \$43,000,000 surplus alleged by the directors.

That the directors paid a 2½ per cent dividend last fall when there was no surplus on hand from which to pay it and that funds to pay the dividend came from borrowing money or issuing stock.

That the company received less than 85 per cent of the proceeds of the sale of \$27,000,000 worth of stock and that the remainder went to brokers.

FORD GOES WELL OVER MILLION MARK

DETROIT, Dec. 21—The Ford Motor Co. went over the scheduled million mark for 1920 at the end of the day's work, Dec. 16. The total that night was 1,002,515 completed vehicles. The plant will continue operating on the present schedule of 4,000 daily until Christmas Eve. The production figures include cars and trucks.

The Ford Motor Co. of Canada and General Motors of Canada, the two largest plants on the Dominion side, will resume full time operations Jan. 3. Canadian Ford now is working four days a week and the General Motors plant is virtually closed.

The Studebaker Detroit plant will close Thursday night until Jan. 10. It is now working three days a week with a limited force. Cadillac will close Dec. 23 for inventory and Packard the following day. Both will reopen Jan. 3.

That the stock issue was in violation of a stipulation that 200 per cent of the net tangible assets and 10 per cent of the net current assets must remain at all times for payments on preferred stock.

That the issuing of this stock damaged the preferred stockholders by \$31,000,000 and the common stockholders by \$48,000,000.

That the directors paid a stock dividend of 150 per cent last July when the company had no surplus.

That the directors borrowed \$25,000,000 at usurious rates, thereby losing \$500,000.

That the directors seek an additional loan of \$25,000,000.

Detroit Steel Products Adds \$4,000,000 Capital

DETROIT, Dec. 20—The Detroit Steel Products Co. has increased its capital from \$1,250,000 to \$5,250,000 and declared a common stock dividend of 300 per cent. President J. G. Rummey says both the United States and foreign representatives report that conditions have improved and the plant workmen are now being used to get the plant into shape for the business revival expected about Feb. 1. The company began operations about sixteen years ago and up to the present period of financial depression it had been running steadily. Production ceased a few weeks ago but the men were retained to overhaul the plant.

IMMEL COMMITTEE NAMED

COLUMBUS, Dec. 18—A committee of seven, headed by M. S. Connors, general manager of the Hocking Valley Railway, has been named by the stockholders of the Immel Co., body manufacturers of Columbus, to look after their interests in the receivership.

Replacements Make Good Business Sure

M. A. M. A. Questionnaire Shows Members Agreed on Normal Revival in 1921

NEW YORK, Dec. 21—Sane confidence in the future of the industry is evidenced by replies received by the Motor and Accessory Manufacturers' Association to a questionnaire sent to its 384 members asking their opinion of the outlook for 1921. The questionnaire emphasized that frank and candid estimates were sought through analysis and honest personal investigation. The replies in most cases came from the ranking executives of companies.

Faith in the economic soundness and strength in the industry was expressed by the parts makers in every case. They display sane optimism and confidence in the future with the belief that normal buying will return next year and bring about a healthy and progressive growth. The following is a composite view of the principal tendencies and characteristics of 1921:

1. Stimulation of business following National Automobile Shows in January.
2. Marked revival of buying about Spring.
3. Greater emphasis upon economic utility of passenger cars and motor trucks.
4. More conservative and prudent business methods.
5. More aggressive and intensive advertising and sales effort.
6. Large normal replacement business.
7. Greater efficiency and economies in production and management.
8. Growing importance of automobile as transportation unit.

One of the queries in the questionnaire was, "Will there be a shortage of automobiles in 1921?" The replies evidenced considerable divergence of opinion. There were quite a number who replied in the affirmative, some in the most emphatic fashion, and others who said "yes" with limitations. All were agreed that the year gives promise of good business. One of the middle-ground statements contains an analysis showing that the replacement business alone would make necessary the building of 1,800,000 vehicles.

Testifying to their confidence in the future of the industry many manufacturers point to increased sales and advertising programs for 1921.

GASOLINE PRICES LOWERED

NEW YORK, Dec. 22—Wholesale gasoline prices have been reduced nine-tenths of a cent in Pennsylvania and Delaware, or from 30.6 cents to 29.7 a gallon.

The Standard Oil Co. of Indiana has reduced the wholesale price of gasoline 1½ cents a gallon to 25 cents, and the retail price one-half cent to 27 cents.

Bankers Discuss Goodyear Future

Refinancing Plan Called for New Directorate—Auditors Report to Be Submitted

(Continued from page 1293)

share of common stock after all depreciation is charged off. An audit now being made by Price, Waterhouse & Co. will be read at the directors' meeting. There has been a very heavy shrinkage in the inventories of the company. Goodyear had contracted for crude rubber in the open market in addition to supplies from its own plantation in Sumatra and it has been necessary to sell much of this large surplus stock to smaller rubber companies in and near Akron. It is understood that much of this surplus crude rubber which was bought at 50 cents a pound and more, has been sold for 17 cents.

There is much speculation in this city as to whether Frank S. Monnett, former Attorney General of Ohio and owner of forty-five shares of preferred stock in the company, who filed suit asking for an accounting and the appointment of a receiver, acted solely in his own behalf. Reports from Akron are to the effect that it is believed there Monnett is acting in the interests of a financial group hostile to Seiberling and also that one of the "Big Six" tire companies is connected with the proceedings.

Significance also is attached in Akron to the fact that Price, Waterhouse & Co. who are now in charge of the Goodyear finances, have had close relations with interests which recently acquired control of a large automobile combination. Confirmation of these reports has been impossible here and there is no reason to believe they are well founded. It is understood, however, that 51 per cent of the common stock of the company was pledged when temporary financing recently was put through.

Bethlehem Stockholders to Protect Interests

NEW YORK, Dec. 22—A committee has been formed, with B. W. Jones, as chairman, at the instance of a number of shareholders of the Bethlehem Motors Corp., which has been in the hands of Receiver C. E. Woods, since Aug. 25, last, to protect the interests of the shareholders and with the ultimate hope of being able to present to the stockholders a plan of reorganization which will preserve their equity in the property. The other members of the committee are Otis A. Glazebrook, Martin E. Kern, and M. Morgenthau, Jr.

A circular to the stockholders says in part:

"It is of the utmost importance that the stockholders should act together in this matter. The present condition of the automobile industry, as well as general financial conditions, increases the

necessity for concerted action. Committees have been appointed to act for the banking creditors and for the merchandise creditors, and it is hoped that the stockholders' committee can co-operate with the creditors' committees in presenting to all parties interested, a practical plan.

"A deposit agreement to be dated Dec. 15, 1920, is now in the course of preparation, and will be sent to stockholders as soon as possible. In the meantime stockholders are urged to deposit their stock with the Bankers Trust Co., 16 Wall Street, New York City, the depository for the committee, in exchange for which a transferable certificate evidencing such deposit will be issued."

Zimmerschied Named Chevrolet Manager

NEW YORK, Dec. 23—Pierre S. du Pont, president of the General Motors Corp., announced to-day the appointment of K. W. Zimmerschied as general manager of the Chevrolet Motor Co. to succeed W. C. Durant. It is understood that F. W. Hohensee will continue as general manager of production for Chevrolet and W. C. Sills as general manager of sales.

Zimmerschied has been identified with the General Motors organization since 1911 and for the past two years has been assistant to the president of the corporation. His first connection with the company was as metallurgist at Flint. During the war he served the Government in Washington and at its close came to General Motors' headquarters here. His relations with Durant always have been close.

FIRESTONE RE-ELECTS OFFICERS

AKRON, Dec. 18—Plans for improving plant facilities were made at a meeting of the Firestone Tire & Rubber Co. directors Dec. 16. These include the building of an interplant railway system of standard gage to connect with the steam roads entering Akron. The old board of directors has been re-elected and the board has elected the following officers: President, H. S. Firestone; vice-president, A. C. Miller; vice-president, Thomas Clements; secretary, S. G. Carkhuff; treasurer, J. G. Robertson. The board voted the regular quarterly dividend on the preferred capital stock, 6 per cent, payable Jan. 15 to stockholders of record Jan. 1.

SELDEN DECLARES DIVIDEND

ROCHESTER, Dec. 18—The Selden Truck Corp. of this city has declared a regular quarterly dividend of 2 per cent on the first preferred stock and the regular quarterly dividend of 2½ per cent on the second preferred stock. Payment of both dividends will be made Jan. 3. The Selden Truck Corp. continues its record of never having missed a dividend payment. Officers of the company were re-elected as follows: George C. Gordon, president; R. H. Salmons, vice-president; William C. Barry, vice-president; H. T. Boulden, vice-president; S. P. Gould, secretary; E. B. Osborn, treasurer.

Akron Is Anxious Goodyear Future

Rapid Descent of Stock Caused Heavy Losses—Seiberling Denies Insolvency

(Continued from page 1293)

payment being adopted with sums deducted from wages and salaries twice monthly to cover payments. Later the company offered preferred and common stock in blocks of two shares of preferred and one of common for \$300, stipulating that payment must be made within ten days. Many employees borrowed to make the cash payments on such stock purchases, giving the stock as collateral. Common stock was then far above par value. Soon after the stock began to depreciate on the market. Banks financing Goodyear employees in their purchases began calling for greater margins and finally liquidated, but not soon enough to stave off losses to themselves, so rapidly did the stock tumble. The rapid descent of Goodyear common and preferred virtually wiped out many men, and plunged others heavily into debt.

After the filing of the suit, Seiberling issued a statement denying allegations that the company was insolvent.

"The claim that the directors of the company have been operating to their personal advantage and to the detriment of the stockholders of the corporation through a company known as the Goodyear Investing Co. is wholly without foundation," Seiberling said. "No such company now exists or ever did exist. There is a company known as the Goodyear Improvement Co., a subsidiary company, owning warehouses of the Goodyear Tire & Rubber Co. in various cities throughout the United States and Canada. This company is operated wholly for the benefit of the Goodyear Tire & Rubber Co., and all profits that ever accrue to it have come to the Goodyear Tire & Rubber Co., and now belong to it."

"Mr. Monnett's statement that the stock dividend declared in June, 1920, and the quarterly dividend paid on common stock in September of this year, were not paid out of surplus earnings is also untrue."

Ample Assets To Meet Debts

Seiberling declared that after charging off all inventory losses the company still has ample assets with which to pay its indebtedness and to cover its entire issue of preferred stock, and still have many millions of dollars for the common stockholders.

"It seems almost unthinkable," he said, "that a man with any business sense would have commended an action as unwarranted as that of Mr. Monnett at this time when business the country over is going through a period of readjustment, and needs the co-operation not only of creditors but especially of stockholders."

S. A. E. Sets Program for Annual Meeting

Twelve Sessions Arranged for Activities—Annual Business Meeting January 12

NEW YORK, Dec. 21—The program of the annual meeting of the Society of Automotive Engineers, which will be held in the Engineering Societies Building, this city, Jan. 11 to 13, has been completed. In addition to the annual meeting winter meetings of the society will be held in Chicago and Columbus, the former on Feb. 2 in conjunction with the National Automobile Show there, and the Columbus meeting Feb. 10, in conjunction with the National Tractor Show.

The program of the New York meeting follows:

TUESDAY, JAN. 11 Standards Meeting

Morning and Afternoon—Discussion of the revisions of and additions to prevailing S. A. E. Standards and Recommended Practices which will be reported by the Divisions of the Standards Committee.

Aeronautic Session.

Evening—Technical meeting to consider the recent engineering developments in aircraft, such as variable camber wings, metal construction, internally trussed wings, retractable chassis, and propellers. Authoritative papers to be presented on these topics.

WEDNESDAY, Jan. 12 Annual Business Meeting

Morning—Election of officers for coming year. Finance, Membership, Meetings, and other committee reports.

The Engineer's Place in the Industry

A definition of the increasing influence of the engineer in industry, the greater responsibility which he must assume, and the necessity for his building confidence around his undertaking. Presented by three prominent executives of the automotive industry.

Body Engineering Session

Afternoon—The genesis of a closer co-operation between engineers engaged in this automotive work. Consideration to be given to tendency in design, construction and methods of production. Encouragement of standardization in this field and reduction in body weight.

Aeronautic Session

The development of commercial aviation using both lighter and heavier-than-air types. Presentation of the progress of air transport in Europe, and study of its future possibilities in America.

Chassis Session

Increasing the efficiency of the automotive chassis to conserve fuel. Study of mechanical losses, advisability of smaller engines and higher axle ratios, reduction of sprung and unsprung weight. Possibility of European types of small cars in America.

"The Carnival"

Evening—The social event of the S. A. E. year! Colorful, mirthful, sensational. The annual reunion of the S. A. E. family where members, wives and sweethearts revel in an environment of music and dance.

ALLIES RELEASE PLANES CONSIGNMENT TO LARSEN

NEW YORK, Dec. 21—Information has been received here that 11 all-metal Junker airplanes consigned to the United States but held up at Hamburg by the Inter-Allied Commission of Control, have been ordered released. It has been learned that these machines are being shipped to John Larsen, who is the Junker's representative in this country and who introduced the all-metal planes to the United States by selling them over the counter at \$30,000 each to the Post Office Department. It is presumed the machines will come into the country through Baltimore. Larsen, it is said, expects to sell 400 Junker planes in this country before May. Several have been ordered by the Navy Department.

THURSDAY, JAN. 13

Fuel Session

Morning—Discussion of efficient utilization of present high endpoint gasoline in internal combustion engines. Analysis of valuable research in the phenomena of combustion and detonation. Employment of increased compression pressure with knock eliminated.

Fuel Session (Continued)

Afternoon—Consideration of combustion and flame propagation. Distribution problems. The petroleum refiner's viewpoint. Extent and effect of crankcase dilution. Symposium of the leading authorities' present views.

Highway Session

Effect of the heavy automotive vehicle on highway surface. The study of subsoil and its relation to surface durability. A meeting to further develop co-operative contact with the civil engineer who builds and maintains the roadbed on which our products operate.

The Annual S. A. E. Dinner—Hotel Astor at 7 O'Clock

Evening—The formal climax of the meeting when engineer, producer and salesman dine in fraternal spirit, exchange stories of the early days of our dynamic industry and hear words of wisdom spoken by eminent leaders in American business. The largest single gathering of representative men in the automotive industry.

JAPAN BUYS ENGINE RIGHTS

PARIS, Dec. 5 (Special Correspondence)—Licenses for the construction of all types of Lorraine-Dietrich aviation engines have been sold to the Imperial Japanese Government. At the present time, Japanese engineers and skilled artisans are at the Lorraine-Dietrich factory, near Paris, obtaining instruction in the building of these engines. As soon as sufficiently advanced, it is intended to build the engines in Japan. The Lorraine-Dietrich line consists of 6, 12, 18 and 24-cylinder engines varying from 150 to 1000 hp. The type which is of greatest interest to the Japanese is the 12-cylinder, 500 hp., with Delco ignition. This engine has a bore and stroke of 126 by 200 mm.

Napier Motors Wins Suit on Title Right

Edge and J. S. Napier Agree to Eliminate Name from New Company's Business

LONDON, Dec. 8—(Special correspondence)—The High Courts have just tried an interesting and in some respects an important motor case affecting the prescriptive right of firms to a title whether personal or otherwise, but of such import that certain wares have come to be identified with it.

The case was an action by D. Napier & Son, Ltd., makers of Napier cars and trucks and airplane engines, to restrain S. F. Edge and J. S. Napier from using the name "Napier" in any way likely to infringe the Napier company's registered trade mark "Napier." The original Napier firm is one of the oldest in the British engineering trade, the firm being started in 1808 by David Napier, and continued directly by members of the family with the same name.

In 1900 the firm became D. Napier & Son and started to make and sell automobiles, and in 1906 registered the name "Napier" as a trade mark. From 1899 to 1912, S. F. Edge, trading first as the Motor Vehicle Co., and later as S. F. Edge, Ltd., was so intimately associated with the Napier output and fame as considerably to increase both the reputation and output of Napier products.

In October, 1912, Edge sold his interest in S. F. Edge, Ltd., to D. Napier & Sons, Ltd., for £160,000 (\$800,000) and agreed virtually to remain out of the trade until 1919. In March, 1919, the Napier company changed its title to Napier Motors Ltd. and subsequently a new company was formed which acquired both the Napier business and the business good will of S. F. Edge, Ltd.

Edge and his co-defendant J. S. Napier formed a £1000 company early this year and in their reply to the suit pleaded that the combination of their names as a company title is fair and reasonable and not calculated to be confused with the other "Napier" title. At the second day's hearing the action was settled by agreement between the litigants on terms which may be summed up as follows:—

Drop Names of Partners

The defendants Edge and John S. Napier to change the name of their firm in such a way that neither the name Edge or Napier forms part of the title, and in general terms not to do anything likely to mislead as to the title "Napier," nor to prejudice the Napier company's rights in the term "Napier." The agreement expressly entitles the defendant J. S. Napier to continue his name rights in respect to automobile goods patented by him, or which may be so patented by him.

The just issued year's trading report of D. Napier & Sons, Ltd., shows on the whole a fair result. A deficiency of upwards of \$900,000 on last year's balance is changed into a surplus of \$340,000.

Aeronautic Bureau Urged on Congress

Importance of Research and Development Work Detailed in Committee Report

(Continued from page 1290)

efficiency and the reduction of engine weight.

The program provides for the continuation of the research into the problem of direct transfer of heat from cylinder walls to air, and, if possible, the extension of the results to the development of efficient cylinder forms.

The development of a radial engine of the air-cooled type has received the serious attention of research laboratories of both Great Britain and France. In this country very little has so far been done along this line, but the Air Service of the Army at McCook Field is now undertaking the problem, and at the present time is developing at two outside laboratories radial air-cooled engines. The Army Air Service has nearing completion an 18-cylinder engine of 600 to 700 horsepower.

The development of an engine particularly suitable for a power unit for the operation of lighter-than-air craft is now being carried on by the Navy Department. To further this work and obtain an engine of general characteristics, and still allow leeway for individual design of detail, the Bureau of Engineering has let contracts to three separate engine manufacturers. The general specifications call for an engine with six cylinders in line, of approximately 300 horsepower, the main characteristics of which will be low fuel and oil consumption, together with a high degree of reliability. One engine of this class being constructed is of the Ricardo type, as it is hoped that by the use of the Ricardo principle of construction the life and reliability of the engine will be greatly increased.

Major General Menoher, chief of Air Service, recommended that in order properly to foster the aeronautical industry, the Government should announce, by legislative enactment, a policy which will provide for the manufacture of aircraft, covering a period of from three to six years, and must at the same time provide the necessary assurance that funds will be appropriated therefor annually during the continuances of the policy.

Highway Officials Seek More Trucks

(Continued from page 1290)

that the restrictions as to loads adopted at Chicago in 1918 after a conference of motor truck manufacturers and highway officials, should be modified until primary highway systems are completed. It is suggested that the maximum allowable total load for secondary high-

ways shall be 12,000 lbs, unless the load is carried on pneumatic tires, when it may be increased to 15,000 lb. None of the limitations suggested have taken into consideration the passenger car, as either system properly designed should accommodate the passenger car when load alone is considered.

Better rail service for the transportation of highway material was promised by A. G. Gutheim of the car service section of the American Railway Association. The lessened demand for coal cars, he said, would permit an easier movement of highway materials.

House Recommends \$100,000,000 for Roads

WASHINGTON, Dec. 21—An appropriation of \$100,000,000 for State road aid has been agreed upon by Republican leaders in the House. This action was taken at an executive session of the House roads committee but it was not stated whether this amount would be made available for work during the coming fiscal year or for that year and the year following.

Representative McArthur, Republican, of Oregon, has introduced a bill which is now before the roads committee, which would make \$400,000,000 of Federal funds available during the next four years. In the interest of economy, however, the Republican steering committee has indicated, it develops, that the appropriation should be limited to \$100,000,000 and should not cover more than a two year period.

Members of the roads committee have expressed the opinion that action will be taken by Congress on road matters during the present session.

Dunlop to Furnish Funds for Plant Here

NEW YORK, Dec. 21—A cable dispatch from London says that the Dunlop Rubber Co. announces that it recently assumed responsibility for providing additional funds to place its American subsidiary in a position to complete construction work on the \$15,000,000 factory at Buffalo and to provide working capital. It said that the greater part of \$5,000,000 has been sent to this country in the last few weeks and that negotiations now are under way to provide further necessary funds for the American company. There have been reports that Dunlop was seeking \$25,000,000 in this country.

CURTISS SUES HANDLEY PAGE

NEW YORK, Dec. 21—The Curtiss Airplane & Motor Corp. has brought two patent infringement suits in the United States District Court against Handley Page, Ltd., and the Airplane Disposal Co., another English corporation. Ten patents are involved in the litigation, which is based on efforts of the defendants to sell in this country surplus war planes which were purchased from the British Government.

METAL MARKETS

METAL producers, both ferrous and non-ferrous, as well as steel manufacturers have begun in earnest the task of adjusting the wage scales of their operatives to the changed condition of affairs. The relative ease with which this dreaded job is being accomplished, is a potent antidote against the lackadaisical attitude which so many producers have displayed ever since values began to hit the toboggan. Moreover, there is comfort in the thought that it was in January, 1920, that the heaviest orders were placed by the automotive industries. It is recalled by the steel trade that in that month, the Ford Motor Co. alone contracted for more than 150,000 tons of steel, including the spectacular purchase of 87,000,000 nuts. While the steel industry, at this time, is in no mood to chase rainbows, it is confident that buying activity is bound to make itself more felt in the first month of the new year. Many of the shut-down's stressed in the daily newspapers, with the good result, perhaps, of putting the fear of starvation into the hearts of malcontents in the ranks of labor, are, in fact, nothing more than the customary holiday and inventory time suspensions which, in normal years, never attracted much attention. The deadlock that has existed for some time in the pig iron market, is showing signs of dissolving in the near future. Coke prices have come down and are still traveling lower, the coal market being under pressure all around, chiefly, however, because the railroads are beginning to realize that, unless fuel costs are speedily reduced, they will not be able to earn 6 per cent. All in all, it seems as though, very early in the new year, prices for all classes of semi-finished and finished steel and non-ferrous metals will have settled on a basis that will permit automotive purchasing agents to enter the market with more confidence in reasonable stability of values than they could in several years.

Pig Iron—The market for No. 2 foundry is anywhere between \$30 and \$35, furnace. Buying is virtually nil but it is gratifying to note that producers are in a more tractable frame of mind, going even so far as to offer pig for first quarter 1921 delivery at a price to be adjusted at the time of shipment on the basis of the "Iron Age" quotation for that week. Offers like these, with the price left open, invariably portend an early getting together of buyers and sellers and an untrammelled course of the market, free from artificiality. With the period for establishing losses for tax reduction purposes drawing to a close, resale transactions are dwindling. Producers' stocks are heavy, those in the South approximating close to 100,000 tons. Nothing further has been heard regarding the Ford Motor Co.'s low priced offerings which, as stated in this report, were obviously intended to be restricted to foundries turning out Ford castings.

Steel—The price for automobile body sheets, No. 22 gage, is 5.70c. While several of the leading automobile sheet independents have shut down, others are filling in with lighter gages while striving hard to secure fresh bookings for automobile sheets. Although the blast furnaces of the United Alloy Steel Co. which caters almost exclusively to the automotive industries, are closed, the company's steel mills are running on a curtailed basis. It appears to be the understanding in the trade that cold-rolled strip steel will be generally placed on the American Steel & Wire Co.'s basis of 6.25c. Hot-rolled remains nominally on a 4c. base.

Automotive Financial Notes

International Harvester Co. has declared a 2 per cent stock dividend on common stock in addition to the regular quarterly cash disbursement of 1½ per cent, which is in the nature of a semi-annual payment. This is in line with the announcement last June when authorized common stock capitalization was increased from \$80,000,000 to \$110,000,000 to enable it to take care of its profit-sharing plan for employees payable in stock and the payment of stock dividends. The payment of the initial semi-annual stock dividend places the common on an 11 per cent annual basis, 7 per cent payable in cash and 4 per cent in stock.

Antigo Tractor Co., Antigo, Wis., which recently purchased the entire business, plant and equipment of the Murray-Mylrea Co., a large foundry and machine shop concern at Antigo, has authorized an increase in capitalization from \$500,000 to \$1,000,000. The new issue will be used to finance additions and improvements in the plant, purchase of additional materials, and otherwise provide for the beginning of quantity production on Jan. 1.

Lee Rubber & Tire Corp. will close the year with no special inventory shrinkage to absorb. Quick assets are well in excess of five times the liabilities. Floating debt is down from a summer peak of \$800,000 to \$500,000. The company in October earned at the rate of \$2.40 a share on its 150,000 shares and for the full year is expected to show slightly better than \$3 a share.

Gold Seal Battery Co., a new \$300,000 corporation organized at Green Bay, Wis., expects to be ready to start quantity production of Gold Seal storage batteries by Jan. 1. Equipment has been purchased for a daily production of 100 batteries a day, with an estimated output of 20,000 during the first year.

Kempsmith Mfg. Co., Milwaukee, has increased its authorized capitalization from \$600,000 to \$1,000,000. The new issue, which is absorbed by the present stockholders, is made to finance the development of the business, following the completion of extensive enlargement of the production facilities within the past year.

General Machine & Tool Co., Jackson, Mich., was granted authority to increase its capital from \$100,000 to \$250,000; American Twist Drill Co., increased from \$200,000 to \$400,000; Universal Body Company, Jonesville, \$25,000 to \$101,500; Gear Grinding Machine Co., \$300,000 to \$400,000.

Van-Dorn Dutton Co. has declared a quarterly dividend of 2 per cent on preferred and 50 cents on common payable Jan. 1. The Van-Dorn Electric Tool Co., an affiliated concern, has declared a 2 per cent dividend on preferred payable Jan. 1, and 45 cents a share on common payable Feb. 1.

Dodge Manufacturing Co. has declared a quarterly dividend of 1½ per cent and an extra dividend of 1 per cent on common payable Jan. 3. A quarterly dividend of 1½ per cent on preferred also has been declared payable Jan. 1.

Great Lakes Malleable Co., Milwaukee, has effected an increase in capitalization from \$150,000 to \$250,000 to accommodate the expansion of the business and production. Ray F. Ethier is secretary.

Telltale Spark Plug Co., Detroit, was incorporated this week with a capital of \$50,000 to operate a machine shop and sell patented spark plugs. The incorporators are Isaac Harris, Isaac Ranson and O. H. Toliver.

Parish & Bingham directors are expected to pass the regular quarterly dividend of \$1 a share when they meet the latter part of December. Depressed demand has cut down operations at the factory to a small scale.

F. B. Stearns Co. has declared a dividend of \$1 a share payable Jan. 10. Business during November was larger than the November business of last year.

Hall Lamp Co., Detroit, has declared a 5 per cent dividend on outstanding common making 20 per cent paid stockholders this year. The last dividend is payable Dec. 24.

Moon Motor Car Co. directors have declared the regular quarterly dividend of 1½ per cent on preferred stock, payable January 3.

Republic Motor Truck Co., Inc., has reduced its directorate from fifteen to nine. The regular quarterly dividend of \$1.75 a share on preferred stock will be paid Jan. 3.

Hupp Motor Car Corp., has declared a quarterly dividend of 1½ per cent on the 7 per cent preferred payable Jan. 2.

International Motor Truck Corp. has declared a dividend of \$1.75 a share on the first and second preferred, payable Jan. 3.

American Lubricator Co., Detroit, increased its capital from \$150,000 to \$117,500.

Reo Motor Car Co., has declared a quarterly dividend of 2½ per cent payable Jan. 3.

Two Companies Divide R & V Manufacturing

EAST MOLINE, ILL., Dec. 18—Charters have been granted by the state to the two organizations which take over the Root & VanDervoort Eng. Co., which for several weeks past has been in process of separating its engine manufacturing and automobile departments.

The Moline Engine Co., a subsidiary of the Moline Plow Co. takes over the manufacture of engines and machinery. It has a capital stock issue of \$1,180,000 preferred and \$1,750,000 common. The Root & VanDervoort Eng. Co. holds all the capital stock and \$1,749,500 common stock is subscribed by the Moline Plow Co.

The R. & V. Motor Co., with a capital stock of \$6,500,000, will continue the manufacture of automobiles. Stock is held largely by interests prominent in the original Root & VanDervoort corporation.

MASON SALES, \$6,598,000

AKRON, Dec. 18—The Mason Tire & Rubber Co. at Kent, Ohio, reports sales for the year ending Oct. 31 were \$6,598,000, being 95 per cent greater than last year, and the net earnings amounted to \$524,000. The company reports its stock on hand in factory and branches to be less than normal. Sales which have gradually declined until October have since gone steadily upward, and it is expected that January sales will be almost normal. The stockholders have voted to change the ending of the fiscal year to Dec. 31, and officers for the ensuing year elected are as follows: Presi-

dent, O. M. Mason; first vice-president, R. W. McKinnon; second vice-president, John H. Diehl; secretary, W. A. Cluff; treasurer, D. M. Mason.

Bank Credits

Written exclusively for AUTOMOTIVE INDUSTRIES by the Guaranty Trust Co., second largest bank in America.

NEW YORK, Dec. 23—The large scale operations in connection with tax payments and Liberty Bond interest payments went through last week with only slight effect on the money market. Call money was plentiful and ruled at 7 per cent, with a range of 6 per cent to 7 per cent. The same rates were quoted the previous week.

Time money held firm until the Dec. 15 disbursements. After these payments there was a slight easing of rates, with nominal quotations, however, at 7 per cent to 7½ per cent for sixty and ninety day paper secured by mixed collateral, as against 7½ per cent to 7¾ per cent the week before. Rates for four, five and six months' paper were quoted at 7 per cent, as against 7 per cent to 7½ per cent the week previous. All-industrial loans were contracted for at about ¼ per cent higher than the rates on loans secured by regular mixed collateral.

The excess reserve over legal requirements of the New York Associated Banks last week showed a decline of \$3,025,710 from the previous week's excess reserves of \$11,247,910. Loans increased \$115,576,000, the first increase reported since Oct. 16, and net demand deposits increased \$12,454,000. Government deposits at \$188,064,000 compare with \$8,408,000 a week ago.

There was little change in the reserve position of the New York Federal Reserve Bank, as shown by the week-end statement. While total bills on hand declined \$69,997,000, and total earning assets \$21,635,000, total cash reserves also declined \$15,513,000, and Federal Reserve Notes in circulation in this center increased \$7,962,000.

The Federal Reserve banks as a whole showed a marked improvement in reserve position last week. Cash reserves increased \$22,061,000, while there were declines in bills discounted secured by Government war obligations of \$10,270,000, and in total bills on hand of \$130,171,000. Total earning assets declined \$92,908,000, and net deposits \$107,707,000. Federal Reserve notes in circulation increased \$32,490,000, and total gold reserves increased \$19,097,000. As a result, the ratio of gold reserves to Federal Reserve notes in circulation, after setting aside 35 per cent against net deposits, increased from 49.2 per cent (the week before) to 50.5 per cent last week. This is the highest since Jan. 30, 1920, when it was also 50.5 per cent.

The liquidation in commodity prices was less marked last week, although curtailed production, particularly in the metal trades, and wage reductions in the clothing trade reflected a lack of confidence felt in some quarters in an immediate improvement in business outlook.

MEN OF THE INDUSTRY

W. L. Carver has been appointed general manager of the Antigo Tractor Co., dating from January 1. He was formerly general manager of the Mid-West Engine Co., Indianapolis, and before that was with Wallis and Moline Plow. **B. W. Keene** of Oshkosh will be a member of the production department.

L. Logie, formerly general sales manager of the Chalmers-Maxwell cos. for Canada and recently associated with tractor interests in Toronto, has been appointed district supervisor for Canada for the Liberty Motor Car Co. **E. G. Soward** has been made special district supervisor for the West-Central states.

Edward S. Babcox has acquired a substantial interest in the India Rubber Review, which for twenty years has been an authority in the rubber industry. The company has been reorganized so that **Theodore E. Smith**, formerly sole owner, is president, and Babcox vice-president.

Max E. Loomis, formerly with the Reo Motor Car Co., has been made advertising manager of the Sparks-Withington Co. of Jackson. Major **Henry L. Hunt**, whom he succeeds, has returned to the newspaper game as editorial writer on the Jackson News.

A. R. Erskine, president of the Studebaker Corp., has been re-elected a Class B director of the Federal Reserve Bank of Chicago. He has just completed his first year of service and now has been honored with a three-year term.

A. R. Johnson has been appointed assistant sales manager of the Auburn Automobile Co., supplementing the work of **J. I. Farley**, vice president in charge of sales. Johnson was formerly with Cadillac and Hyatt.

N. S. Beebe, who handled the financing of the Northway Motor Co., Boston, and previously with the Templar Motor Co., has become associated with the Kelsey Motor Co., Newark, N. J., as a financial executive.

Earl E. Harrington has begun service as general superintendent of the Delion Tire & Rubber Co., Baltimore. His last service was with Goodyear in the technical service division of the development department.

R. B. Merrill has disposed of his holdings in the Detroit Motor Parts Co., and in the future will devote his time to the Atlas Machine Works, of which he is secretary and treasurer.

T. S. Merrill of Detroit, secretary, of General Motors Corp. has been designated Michigan representative of the Corporation, according to papers filed in Lansing in accordance with the state laws.

W. H. Mooney, sales engineer of the Dayton Engineering Laboratories Co., has been appointed assistant sales manager of that organization, starting Jan. 1.

M. M. Friede has been made sales manager of the Disco Electrical Manufacturing Co., to succeed **A. C. Hyser**.

C. L. Mason has been appointed sales manager of the Denman Myers Cord Tire Co., with general offices at Cleveland.

Lon R. Smith has been elected vice-president in charge of sales and advertising of the Mid-West Engine Co., Indianapolis.

HANSEN & TYLER ASSIGN

FORT DODGE, IOWA, Dec. 20—Hanson & Tyler, one of the largest distributors in the State, have made voluntary assignment in bankruptcy. No formal statement of the financial condi-

tion of the firm has been announced although accountants are engaged now in the check. It is estimated that assets will be \$1,317,230 and liabilities \$830,000. Annual business of the company amounted to more than \$2,000,000. Its present condition is attributed to tight money and refusal of banks to handle automobile paper. The firm maintained headquarters here with five branches in Des Moines, Omaha, Webster City, Sioux City and Sioux Falls, S. D.

Erie Seeks Capital
to Effect Merger

SANDUSKY, OHIO, Dec. 21—The report of the stockholders' committee investigating the affairs of the Erie Tire & Rubber Co. shows current assets and inventories valued at \$1,969,479.48, fixed assets \$688,555.07, and deferred charges of \$1,955,527.50. Liabilities, current and accrued, total \$225,241.84.

Analysis of the current assets shows cash balances, \$10,240.77; accounts receivable, \$813,740.94; notes receivable, \$54,531.84, and accounts receivable upon capital stock, \$631,436.17. Inventories total \$458,579.76, and cash balances, \$10,240.77.

Plans to merge the company with others in a new corporation are under consideration, the committee announced, but before this can be done debts must be liquidated and working capital supplied. This would require \$2,500,000. With this supplied the merger would be put through and new officers elected to head the new corporation.

Companies which would be linked with the Erie company in the proposed merger are said to be the Stanwood Rubber Co., Elizabeth, N. J., and the Hardman Rubber Co., New Brunswick, N. J. Both of these are in the hands of temporary receivers owing to lack of working capital. Extensions of time were recently given them to work out merger plans.

TO ACT ON CLASSIFICATIONS

NEW YORK, Dec. 21—The consolidated classification committee of the National Automobile Chamber of Commerce will meet at 143 Liberty Street, this city, on Jan. 10, and at the Transportation Building, Chicago, on Jan. 17, to consider proposed changes in classification on body and top irons, engine hoods, steering gear assemblies, axles and radius rods. Members whose shipments would be affected by changes in classification of any of these items are requested to inform the committee.

TO MAKE ANTI-LEAK PRODUCT

BINGHAMTON, N. Y., Dec. 21—The New-Metal Products Corp. has been organized here to manufacture a product designed to mend leaks in metals without the use of heat. The company will take over the business formerly conducted in New York. Officers of the new company are: **Fay E. Spawn**, president; **Archibald Howard**, vice-president, and **H. H. Hathaway**, secretary and treasurer.

INDUSTRIAL NOTES

American Autoparts Co., Detroit, has completed its first manufacturing unit, a chassis spring plant, representing an initial investment of \$3,000,000, and is entering full operation. Officials of the company are **W. E. Perrine**, president; **F. F. Grimmelman**, vice-president and general manager; **W. P. Culver**, vice president and sales manager, and **J. W. Stannard**, secretary and treasurer.

Detroit Steering Wheel Corp., Detroit, has been taken over by the Tiltlock Steering Wheel Corp. **W. F. Fliedner**, general manager, will be in charge of the new company. He also is general manager of the Disco Electrical Mfg. Co. The Company makes steering wheels for a number of the larger automobile companies.

Rolls-Royce of America has closed its Springfield, Mass., plant for two weeks, affecting between 500 and 600 employees. It is declared the shut-down is for inventory purposes and no wage reductions are contemplated.

Acme Universal Joint Mfg. Co., Kalamazoo, has been absorbed by the Hartford Automotive Products Co., and its name will soon be changed. The main office will be moved to Hartford.

Stromberg Carburetor Co. closed its Chicago plant December 20 and will continue closed to January 3. It is now employing four men four days a week. Normally it has a working force of 400.

Jenckes Spinning Co., Providence, has closed down in most departments until January 3. Employees were asked to turn in their pay checks.

Automotive Products Co., Cleveland, has changed its name to the Auto Accessory & Engineering Co.

United Automotive Body Co. will take over the output of the Champion Wagon Co., Owego, N. Y.

TO BUILD \$1,000,000 PLANT

ATLANTA, Dec. 21—Officials of the International Steel & Motors Corp. have definitely announced that Atlanta will be the headquarters of the company and that a plant will be constructed near Rome, Ga., to manufacture a line of general steel products, primarily automobile parts. The corporation was organized some months ago with \$10,000,000 capital. The new plant is to cost about \$1,000,000. It will not be ready for operation before the spring of the coming year, according to **K. L. Jones**, of Atlanta, a stockholder and director of the company.

When the company was organized it was planned to manufacture only automobile and motor parts, but it has since been decided to turn out a general line of steel products. The company will operate its own iron ore mines in Georgia.

FIRESTONE CONNECTS PLANTS

AKRON, Dec. 20—The Firestone Tire & Rubber Co. of Akron will have its own railroad system connecting all factory units starting in February. The work of laying track is now proceeding with the co-operation of the trunk line railroad whose lines run parallel to the Firestone factories.

Calendar

SHOWS

Jan. 3-8—New York, Motor Truck Show, Motor Truck Ass'n of America, Twelfth Regiment Armory.

Jan. 8-15—New York, National Passenger Car Show, Grand Central Palace, Auspices of N.A.C.C.

Jan. 10-17—Portland, Ore., Annual Automobile Show, Automobile Dealers' Ass'n. Municipal Auditorium, M. O. Wilkins, Mgr.

Jan. 15-29—Philadelphia, Annual Automobile Show, Philadelphia Automobile Trade Ass'n.

Jan. 17-23—Milwaukee, Annual Automobile Show, Milwaukee Automotive Dealers' Ass'n.

Jan. 22-27—San Francisco, Second Annual Pacific Coast Automotive Equipment Exposition, Auditorium.

Jan. 22-29—Baltimore, Annual Automobile Show, Baltimore, Automobile Dealers' Ass'n, 5th Regiment Armory, J. C. O'Brien, Mgr.

Jan. 22-29—Cleveland, Annual Passenger Car Show, Cleveland Mfr's & Dealers' Ass'n, Wigmore Coliseum.

Jan. 22-29—Montreal, Annual Automobile Show, Montreal Automobile Trade Ass'n, Motordrome Bldg.

Jan. 29-Feb. 4—Chicago, National Passenger Car Show, Coliseum, Auspices of N.A.C.C.

Feb. 5-12—Minneapolis, Annual Automobile Show, Minneapolis Automobile Trade Ass'n.

Feb. 6-12—Columbus, National Tractor Show, Columbus Tractor & Implement Club, Ohio State Fair Grounds.

Feb. 12-19—Hartford, Conn., Annual Automobile Show, Hartford Automobile Dealers Ass'n, Armory, Arthur Fifoot, Mgr.

Feb. 12-19—Kansas City, Annual Automobile Show, Kansas City Motor Car Dealers' Ass'n.

Feb. 14-19—St. Louis, Annual Automobile Show, St. Louis Automobile Mfrs & Dealers' Ass'n, Robt. E. Lee, Mgr.

Feb. 14-19—Winnipeg, Western Canada Automotive Equipment Show.

Feb. 18-28—San Bernardino, Cal., National Orange Show, Fred M. Renfro, Mgr.

Feb. 19-26—San Francisco, Fifth Annual Pacific Automobile Show, Exposition Auditorium, George Mahlgreen, Mgr.

Feb. 21-26—Louisville, Annual Automobile Show, Louisville Automobile Dealers Ass'n, First Regiment Armory, C. L. Alderson, Sec'y.

Feb. 21-26—Salt Lake City, Annual Automobile Show, Intermountain Automotive Trades Ass'n, W. D. Rishal, Mgr.

Feb. 26-Mar. 5—Buffalo, Annual Automobile Show, Buffalo Automobile Dealers Ass'n, 74th Regiment Armory, C. C. Proctor, Mgr.

Mar. 2-10—Des Moines, Annual Automobile Show, Coliseum, C. G. Van Vliet, Mgr.

Mar. 5-12—Brooklyn, Annual Automobile Show, Brooklyn Motor Vehicle Dealers' Ass'n, 23d Regiment Armory, George C. Lewis, chairman.

Mar. 7-12—Syracuse, N. Y., Annual Automobile Show, Syracuse Automobile Dealers Ass'n, Armory, Howard H. Smith, Mgr.

Mar. 7-12—Indianapolis, Annual Automobile Show, Indianapolis Automotive Trade Ass'n, Automobile Bldg., State Fair Grounds, John Orman, Mgr.

Mar. 12-19—Boston, Annual Automobile Show, Mechanics Bldg. and South Armory.

Mar. 14-19—Omaha, Annual Automobile Show, Omaha Automobile Trade Ass'n, Inc., Omaha Auditorium, C. G. Powell, Mgr.

April 4-9—Seattle, Annual Automobile Show, Seattle Motor Car Dealers' Ass'n, Arena Hippodrome.

April—Chattanooga, Tenn., Spring Automobile Show, Chattanooga Automotive Trade Ass'n, Sunday Tabernacle, C. A. Noone, sec'y.

FOREIGN SHOWS

Jan. 7—Sydney, Australian Motor Show.

Jan. 22-29—Colombo, Ceylon Motor Show.

Feb. 7—Delhi, India, Delhi Motor Show.

Mar. 23-28—Witwatersrand Agricultural Show including machinery and motors sections.

CONVENTIONS

Dec. 28-30—Chicago, Annual Meeting American Society of Agricultural Engineers.

Jan. 7—New York, Advertising Managers Council, Motor & Accessory Manufacturers Ass'n.

Jan. 11-13—S. A. E. Annual Meeting, New York City.

Feb. 2-4—Chicago, First Annual Meeting, Automotive Electric Service Assn. Hotel La Salle.

May 4-7—Cleveland, National Foreign Trade Council.

Oct. 12-14, 1921—Chicago, Twenty-Eighth Annual Convention National Implement & Vehicle Ass'n.

Good Roads Congress Works for Co-operation

NEW YORK, Dec. 21—The Eleventh American Good Roads Congress and Twelfth Good Roads Show scheduled to be held in Chicago, Feb. 9 to 12, by the American Road Builders Association, will be the most important of the series. With 1921 to usher in the most active era of road building the country has known, the association is endeavoring to link all persons interested in highways into the closest co-operation.

Such topics as "Better Methods and Materials in Road Construction and Maintenance," "Highways as Railroad Feeders," "Road Finance," "The Powers and Duties of Highway Officials," "The Use of Convict Labor on the Roads," "Types of Roads," "Testing Materials," "Improving Rural Marketing Conditions with Better Roads," "Good Roads as a Means of National Defence," "Truck Transportation," "Problems of Road Construction," "The Use of Tractors," "Road Legislation," "Highway Specifications," "Bridge and Culvert Construction," "The Good Roads Movement," and "State and Government Aid," will bring together for an exchange of views large numbers of highway officials and engineers, congressmen and legislators.

FENN TALKS TO BREEDERS

SYRACUSE, N. Y., Dec. 17—F. W. Fenn, secretary of the motor truck committee of the National Automobile Cham-

ber of Commerce, discussed motor truck transportation on the farm, at a meeting of the New York State Breeders' Association here yesterday. Many of the breeders who attended the meeting already use motor trucks, and several of them told Fenn they would be unable to meet modern agricultural conditions without the use of motor vehicles.

Dirigible Operation Laid Over for Time

AKRON, Dec. 18—Ralph Upson, the only American to win the James Gordon Bennett international balloon race trophy, and until recently chief aeronautical engineer of the Goodyear Tire & Rubber Co., has abandoned, temporarily at least, his plans for formation of a large aeronautical syndicate for the manufacture of dirigibles and control and operation of inter-city passenger and express dirigible service. Upson upon leaving Goodyear two months ago, stated that at that time he had under definite consideration a proposal which it is understood came from a group of prominent men who were ready to provide ample financing, to launch such a dirigible project, and to devote his time to the perfection of an entirely new and more feasible type of lighter-than-air craft.

The current financial and business depression has resulted in deferment of all such plans. Upson is now in Washington in the capacity of consulting aeronautical engineer for the government, in assisting the navy and war departments.

Motor Boat Experts

Address S. A. E. Section

NEW YORK, Dec. 18—A motor boat meeting and dinner of the Society of Automotive Engineers was held at the Automobile Club of America this week. Vice-president C. A. Criqui presided. The speakers at the dinner were William W. Nutting, who told of his experiences in twice crossing the Atlantic in a 45-ft. boat; William B. Rogers, Jr., who spoke on standardized motor boats, and Henry R. Sutphen, who emphasized the need of maintaining an American merchant marine and commended the society for its motor boat standardization accomplishments.

Following the dinner a professional session of the society was held. Lieut. Commander H. Gibson, U. S. N., was the first speaker. He gave some additional and very interesting data on German submarine engine construction, supplementing similar data presented at previous S. A. E. gatherings. A second paper, entitled "The Commercial Motor Boat and the Diesel Engine," by G. C. Davison, was read in the absence of the author. The final paper of the evening dealt with the standardized motor boat, and was presented by William Deed.

During the afternoon preceding the meeting the metropolitan section of the society entertained the Pennsylvania section at luncheon, after which both sections visited the plant of the Consolidated Ship Building Corp. at Morris Heights.